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ABSTRACT

This guidebook is designed to help New York school staff better understand the specialized needs of students with traumatic brain injury (TBI) and appropriately apply educational interventions to improve special and general education services for these students. It provides information on the following areas: (1) the causes, incidence, and characteristics of TBI; (2) factors unique to TBI as a disability category; (3) special considerations in the assessment of students with TBI; (4) the school's role as the student with TBI reenters school; (5) strategies for school personnel to assist students with TBI in learning skills, managing behavior, and dealing with social and emotional difficulties; (6) resources for further information and technical assistance; (7) other state agency resources; and (8) information regarding school-based prevention efforts. Educators are urged to identify appropriate Individualized Education Program goals and short-term objectives for students with TBI in the areas of cognitive processes and development of compensatory strategies; the development of behaviors and social skills for successful school, family, and vocational functioning; and the improvement of executive functions in order for the student to learn and behave more independently and effectively. Specific compensatory strategies are listed, along with environmental and instructional modifications. (Contains 54 references.) (CR)

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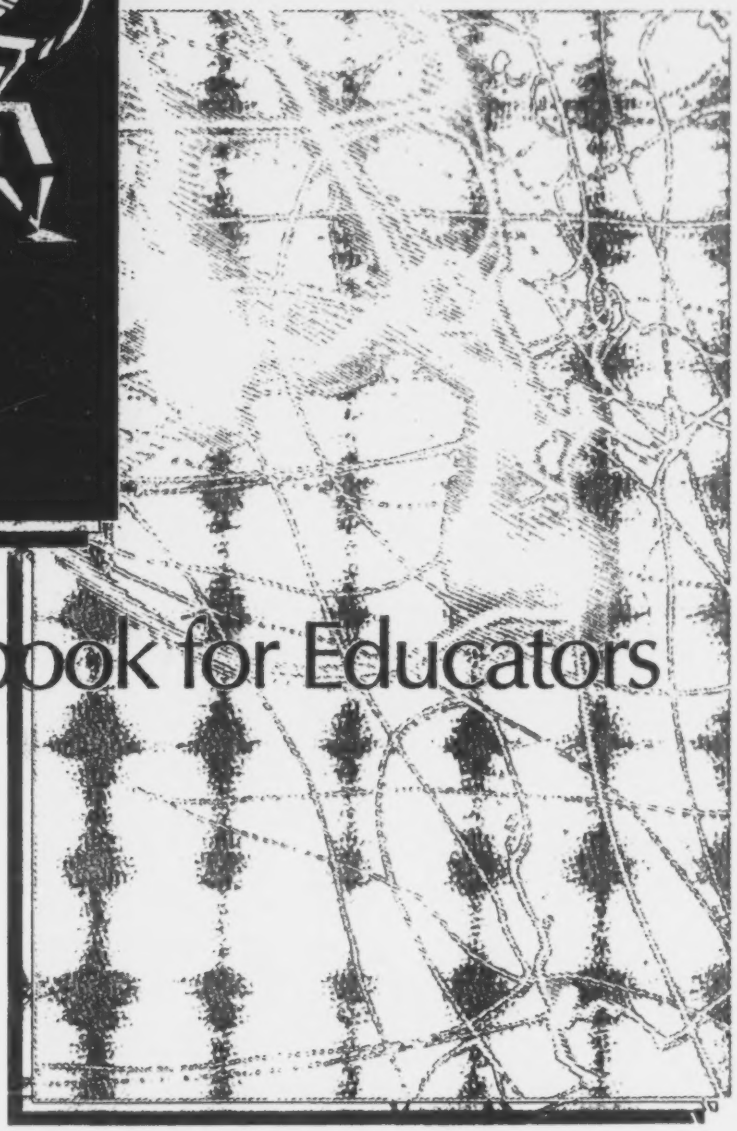

A Guidebook for Educators

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EXECUTIVE COORDINATOR
OFFICE FOR SPECIAL EDUCATION SERVICES

TO: Professionals and Parents Who Are Involved in the Education of Students with Traumatic Brain Injury

FROM: Thomas B. Neveldine

SUBJECT: *Traumatic Brain Injury: A Guidebook for Educators*

The New York State Education Department has been involved in several projects to improve the quality of services provided to students with traumatic brain injury in educational settings. Through training, technical assistance projects, and publications such as *Traumatic Brain Injury: A Guidebook for Educators*, the Department will help school staff to better understand the specialized needs of students with traumatic brain injury and appropriately apply educational interventions to improve special and general education services for these students.

Copies of this manual are available by contacting the New York State Education Department, Publications Distribution Unit, Room 309 EB, Albany, New York 12234 or by contacting Special Education Training and Resource Centers (SETRC) as listed in Appendix H of this publication.

Questions regarding this publication may be directed to the Office for Special Education Services, (518) 474-5548.

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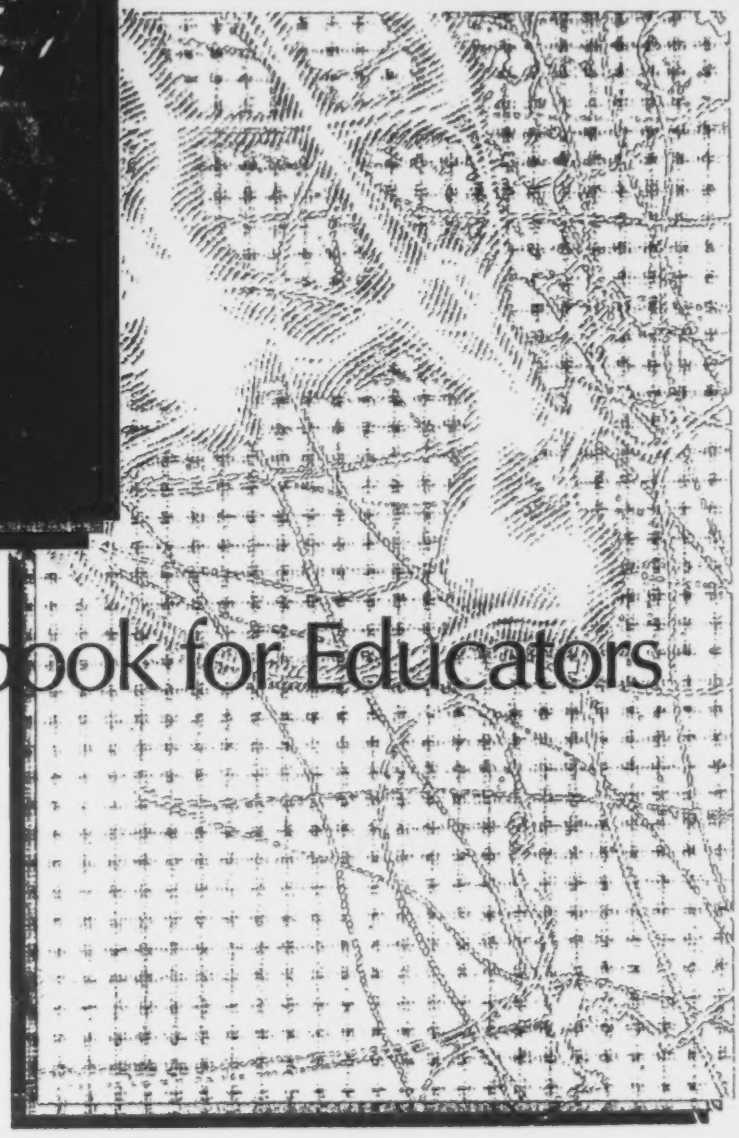

A Guidebook for Educators

The University of the State of New York
The State Education Department
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Contents

	Page
Acknowledgments	iv
Introduction	1
What Happens in a Brain Injury?	3
What are the Effects of a Traumatic Brain Injury?	9
What are the Special Considerations in Conducting Assessments for Students with Traumatic Brain Injury?	16
Why is Traumatic Brain Injury an Educational Disability?	23
What Needs to be Considered in School Reentry and Program Planning?	27
What Strategies and Approaches are Effective for Educating Students with TBI?	36
What are the Social and Emotional Effects of Traumatic Brain Injury?	47

Appendices

A. Coma Scales	50
B. Examples of Medical Conditions That May Lead to Traumatic Brain Injuries	52
C. Possible Cognitive Problems Following Traumatic Brain Injury in School-Age Children	53
D. Interventions for Students with Cognitive Needs	58
E. Regional TBI Technical Assistance Projects	62
F. Resources for School Personnel: Prevention, Information and Advocacy, Training, Interagency	65
G. Questions and Answers Related to Traumatic Brain Injury	71
H. Special Education Training and Resource Centers	74
I. References	77

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Introduction

Many children each year receive an injury to the head, have serious illnesses, or are treated for serious medical conditions which cause a traumatic brain injury (TBI). Moderate to severe injuries, and in some cases mild injuries, can lead to immediate and long-term impairments in physical, social, emotional, cognitive, and behavioral development. Schools are the normal environments for children and are central to assisting students with TBI in overcoming the challenges they face.

As more children survive serious childhood accidents and illnesses, it is vital for schools to have the knowledge and skills to identify and address their educational needs. This manual has been prepared to help school staff to better understand the specialized needs of students with TBI and appropriately apply educational interventions to improve special and general education services for these students. To this end, this manual is designed to assist school personnel, including general and special education teachers, related services providers, administrators, aides, and others working with students with TBI. While this manual will emphasize the important and unique characteristics of students with TBI, educators will realize that many of the assessment and educational approaches used with other students will be appropriate for students with TBI.

"Schools are . . . central to assisting students with TBI in overcoming the challenges they face."

This manual provides information on the following areas:

- ❑ The causes, incidence, and characteristics of TBI.
- ❑ Factors unique to TBI as a disability category.
- ❑ Special considerations in the assessment of students with TBI.
- ❑ The school's role as the student with TBI reenters school.
- ❑ Strategies for school personnel to assist students with TBI in learning skills, managing behavior, and dealing with social and emotional difficulties.
- ❑ Resources for further information and technical assistance.
- ❑ Information regarding other State agency resources.
- ❑ Information regarding school-based prevention efforts.

The New York State Education Department is committed to providing training and technical assistance to assist schools in educating students with special needs. The Department has undertaken initiatives for training, model program development, and information dissemination to assist schools to appropriately evaluate students and plan and implement educational programs to meet the

unique needs of students with TBI. Regional two-day training sessions, "Education of Children with Traumatic Brain Injury," have been conducted by the Department throughout the State. In addition, regional model programs are funded to assist children with TBI to return to school (see Appendix E). Each project provides direct services to school personnel including training, consultation and technical assistance, assistance to families of students with TBI, and coordination with medical and rehabilitation programs which have served these students.

What Happens in a Brain Injury?

Brain injuries can be the result of an external blow to the head or a movement of the head which causes an open or closed injury. An example of an open head injury is a gunshot wound. Closed head injuries can result from child abuse, falls, bicycle accidents, sports injuries, assaults, and motor vehicle accidents. It is important to note that the head does not have to actually hit a surface to incur a brain injury. Any motion which causes the brain to move rapidly about inside the skull and suddenly stop may cause brain damage (e.g., "Shaken Impact Syndrome").

Brain injuries can also be the result of certain medical conditions which affect the supply of blood or oxygen to the brain or change the brain tissues or structures. Examples of such conditions include anoxia, tumor, encephalitis, meningitis, stroke, and aneurysm. In addition, surgical treatment for childhood tumors, and cranial or central nervous system radiation for cancers such as leukemia may also cause injury to the developing brain (Peckman, 1991).

Incidence

Approximately 1 in 500 children each year sustains a head injury which requires hospitalization, and approximately three percent of children born this year will have sustained a head injury by the time they reach adolescence (Mira et. al., 1990). Because the effects of brain injury may persist for years, the cumulative effect in terms of the numbers of children with brain injuries being served by schools far exceeds three percent. The peak incidence for brain injuries is between the ages of 15 and 24, although the incidence is also high for children under age 15, particularly preschool children (Savage, 1988). The incidence of brain injuries that are a result of medical conditions adds to these statistics. As medical treatment improves, more children are surviving head injuries and medical conditions that result in brain injuries.

The Brain

The brain is a firm, gelatin-like organ surrounded by cerebral spinal fluid and encased in a rough, bony, rigid skull. The front part or frontal lobe of the brain rests on a bony, rough area of the skull located over the eye sockets. Parts of the temporal lobes rest against the rough sides of the skull. The strongest area of support is from the base of the brain where the brain stem connects with the spinal cord which is held in place by the vertebrae. The brain is made up of microscopic neurons held in place by a jelly-like substance. Chemicals in the form of neurotransmitters allow neurons to rapidly and efficiently send, receive, and store information. Damage to the brain often results in localized injury to specific areas of the brain, injury to blood vessels which supply oxygen to the brain and regulate blood flow, and disruption to neurochemicals. Brain injuries in children are usually diffuse, meaning that the injury can affect many areas and functions within the brain. Therefore, since

the areas of the brain are interconnected, damage to any part of the system can often result in cognitive, motor, sensory, emotional, and behavior changes.

The organization of the brain is complex, but it is known that certain areas regulate certain functions and are likely to show observable effects after an injury (Bryn Mawr Rehab., 1990; NYSED Training Manual, 1991). Examples of these include:

frontal lobes: reasoning and executive functions (e.g., goal setting, planning, organizing, initiating, inhibiting, monitoring, evaluating, problem solving)

brain stem: temperature regulation, heart rate, respiration, muscle tone, consciousness, eye movements

limbic system: emotional functioning, new learning

temporal lobes: hearing, receptive language, memory

occipital lobes: visual perception, field of vision, depth perception, visual tracts

motor strip: aspects of gross and fine motor functioning

parietal lobes: aspects of visual and spatial processing.

"Brain injuries in children are usually diffuse . . . Damage to any part of the system can often result in cognitive, motor, sensory, emotional, and behavior changes."

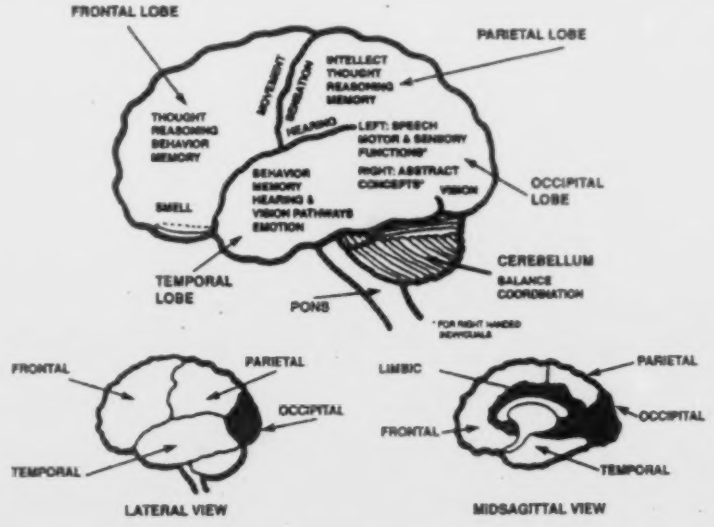

Figure 1. Functions of the Cerebral Hemispheres

Reprinted from: Brain Injury Family Guide
Bryn Mawr Rehab. 1990, p. 8 (upper figure)

Fischbach, G. et. al, 1992 (lower figures)

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Frontal lobe damage, which is common in traumatic brain injury, is significant in that it results in problems with behavior regulation and executive functioning (organizing, initiating, etc.). Frontal lobe damage also contributes to delayed onset of symptoms (problems may show up when academic and social demands increase and/or as the child gets older). Individuals with frontal lobe damage may perform well on tests, but poorly in life situations that demand self-regulation of behavior and which rely upon learning new information and skills.

Impact Injuries

In falls and other accidents, the brain is injured not only by the impact, but also by the movement of the brain inside the skull causing stretching of brain tissues and contusions and lacerations. When the head is in motion and then is stopped, the brain rocks forward and backward with the vertebrae acting as the point of rotation causing diffuse injury from *shearing* of brain cells just above the brain stem and deep within the brain. The force of the impact causes the brain to hit the skull at the point of impact and then to rock backwards and hit at the opposite side of the skull. The resulting injuries are referred to as *coup*, which is the damage resulting from the initial impact, and *contrecoup* which is the damage occurring on the exact opposite part of the brain. As the brain moves rapidly within the skull, it moves across the bony protrusions in the skull causing *surface injuries* (contusions and lacerations). The frontal and temporal lobe areas of the brain are particularly vulnerable to injury because the parts of the skull closest to the frontal lobes and temporal lobes are quite rough and will cause a great deal of surface damage when the brain is forced up against them. These injuries to specific areas are called *focal injuries*. Diffuse injury to the brain can occur from rotational forces which cause axons to stretch or tear and from pressure waves in the brain in a rapid acceleration-deceleration injury. Diffuse damage to the brain, due to rotational forces which cause brain tissues to stretch, can result even when there is no loss of consciousness.

The brain often does not fully recover from damage that occurs through impact, surface, and shearing injuries. The child's ability to learn may be significantly affected by these injuries.

The Brain Reacts to Injury

After an injury to the brain occurs, the biochemical makeup of the brain reacts to the injury. The cells begin to absorb water causing swelling in the brain. Damage to the veins or arteries in the brain may cause bleeding in the brain. Both swelling and bleeding in the brain may lead to rapid and dangerous increases in pressure inside the skull. The neurotransmitters which relay messages from one neuron to another may be disrupted. All of these secondary effects may cause further brain damage beyond that which occurs at the time of injury. Medical treatment is aimed at controlling these life-threatening secondary brain injuries. As these secondary injuries subside, recovery of certain functions often occurs.

Types of Damage in Closed Head Injuries

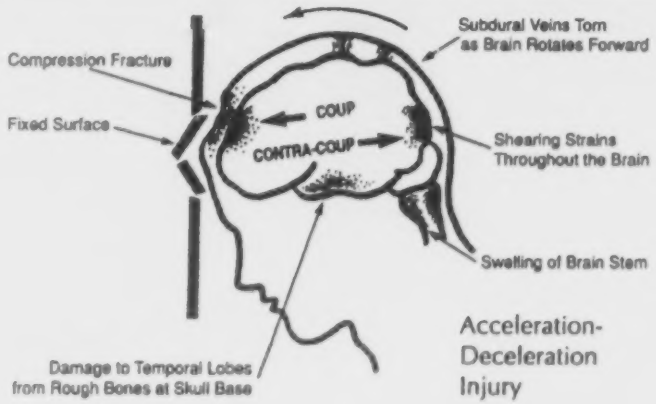

Figure 2. Impact Injuries

Reprinted from:

An Educator's Manual: What Educators Need to Know About Students with Traumatic Brain Injury, prepared by The N.H.I.F., Inc. National Task Force on Special Education for Students and Youths with Traumatic Brain Injury, 1985. Reprinted with permission of the National Head Injury Foundation.

Medical Conditions

Certain medical conditions such as stroke, encephalitis, meningitis, aneurysm, anoxia, or brain tumor may result in structural and biochemical changes to the brain which affect cognitive function and school achievement. A tumor, for example, will cause injury to the brain depending on the location of the tumor. The treatment for that tumor (neurosurgery, whole brain radiation therapy, chemotherapy), however, may cause diffuse damage (Peckman, 1991). Brain irradiation, which is often used for the treatment of tumors and acute lymphocytic leukemia, affects the long-term replication of brain cells. "The most consistent research finding about children who have cranial radiation and intrathecal chemotherapy for acute lymphocytic leukemia is that they are more likely than other children to have learning disabilities" (Vander Water, 1991). Cognitive deficits that occur as a result of cranial radiation treatment may emerge anywhere from one to five years after the radiation treatment. Individuals with infections or inflammation of the central nervous system and meninges caused by viruses, bacteria, etc. such as meningitis or encephalitis may have long-term neurological residual effects and require careful monitoring for auditory, visual, and cognitive effects (Ikeda and Young, 1992). The medical conditions described above identify examples of possible causes of brain injury but are not intended to be an exhaustive list. It is important that schools closely monitor children with brain injuries due to medical conditions for effects on cognitive functioning and school achievement that can occur years after the incident and treatment.

Severity of Injury

Brain injuries are often medically categorized as mild, moderate, or severe, depending upon the length of time the child is unconscious and the period of time of post traumatic amnesia (Long, 1991). (Post traumatic amnesia refers to the period of time after an injury in which the child exhibits a loss of day-to-day memory for recent events). Often the most serious injuries result in coma or unconsciousness. As an initial measure of severity, children in coma will often be evaluated using a scale such as the Glasgow Coma Scale or Ranchos Los Amigos Coma Scale which measures the child's response level in various areas (see Appendix A). While these scales provide an initial indicator of severity of the injury, they do not necessarily predict the long-term consequences of the injury. However, even injuries that do not lead to coma can have significant cognitive and behavioral consequences. A concussion or a brief loss of consciousness which may seem minor can have significant effects. After a mild injury, symptoms such as headache, nausea, dizziness, disorientation, confusion, agitation, and fatigue are common. These effects can improve relatively quickly but often persist for weeks and months. In many cases, however, even an injury medically classified as "mild" may result in long-term cognitive and behavioral problems (Dikeman, 1993; Kay, 1986). Children with moderate to severe injuries almost always incur some long-term consequences from injuries.

Age and Injury

While young children often recover physically from serious accidents which cause brain injury faster than adults, the long-term cognitive problems are often more profound than with adults. The brain of a child continues to develop throughout childhood and adolescence. Injury to a developing brain alters that development. The younger the child, the more profound the long-term effects of brain injury may be, particularly in the areas of behavioral self-regulation and learning. When a brain injury occurs, information previously learned is often retained. However, brain injury often has a profound effect on new learning. Younger children, particularly preschool children, do not have the same knowledge base to build upon and may experience great difficulty mastering new skills. (Mira, Tucker, and Tyler, 1992) (Ylvisaker, 1992).

Because injuries in children and adolescents occur in brains that are in the process of developing, the cognitive, social, and behavioral effects are often not seen until later in life when those developmental skills are required. Monitoring children with brain injuries over time for these "delayed consequences" is critical.

KEY POINTS

- ❑ When there is physical trauma to the brain, the damage is almost always diffuse.
- ❑ Every child with a brain injury presents a unique profile.
- ❑ The frontal and temporal lobe areas of the brain are particularly vulnerable to injury.
- ❑ The child's age when an injury occurs influences the outcome. The younger the child, the more profound the long-term effects may be, especially with respect to behavioral self-regulation and learning.
- ❑ Injuries to a "developing brain" may result in delayed consequences. Anticipate and prepare for later learning problems.
- ❑ Certain medical conditions result in both localized and diffuse brain injuries. The treatment for such conditions (e.g., chemotherapy and cranial radiation treatment) can result in cognitive and learning problems that may not emerge for one to five years after treatment.

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What are the Effects of a Traumatic Brain Injury?

There is a wide range of physical, cognitive, and behavioral effects which can result from brain injuries. The injuries often cause diffuse damage and many interrelated brain functions can be affected. Although there are common areas of difficulty, the outcomes are extremely diverse with each child having a unique pattern of strengths and difficulties. Each brain injury differs from child to child as does the rate and degree of recovery.

Children with TBI have great potential for growth and development. They often make remarkable progress in many areas and compensate for losses by developing new strengths.

The following section presents an overview of possible effects following traumatic brain injury, but it is not intended to present a profile of any one child. It is unlikely that any one student would have all of the following effects. However, an understanding of these possible effects of injury to the brain will assist the educator in determining student needs and identifying appropriate services and strategies to facilitate the child's success in school.

Initial Effects

In the first few days following trauma, the child may experience a variety of medical and physical complications, including swelling of the brain, edema (excess cerebral-spinal fluid), respiratory difficulty, and seizures. Motor problems are often experienced early. Examples include rigidity, spasticity, coordination difficulties, and tremors. As the child emerges from coma, he/she may experience temporary neurologically-based irritability, agitation, and aggression or may lack any emotional expression. As the child improves, he/she may be able to follow simple routines and directions. The child may show memory for past events, but remain confused with poor memory of recent and current events.

These early, immediate problems usually diminish very rapidly and the overt symptoms subside considerably. This early, relatively rapid improvement is often interpreted as an indication that subsequent recovery will be as rapid and complete (Mira et. al., 1991). However, children with severe, moderate, and sometimes even mild injuries, may have persistent cognitive, behavioral, and sensorimotor difficulties.

Cognitive Effects

Long-term cognitive effects are typically experienced by children with TBI and can affect their memory, attention, concentration, and executive functions.

Memory

Memory deficits are among the more common and lasting effects following brain injury (Ewing-Cobbs, et.al, 1987). Children may have difficulty with encoding, storing, and retrieving new information. This is particularly true when the information is presented quickly or in great amounts or in detail. These difficulties can affect the child's ability to learn new curriculum material, new and sub-

tle social and behavioral skills, and new spatial integrative tasks (Kay, 1986). Because prior memory can often be well preserved, teachers may not initially realize the difficulty a student is having in learning new academic material, in finding the way around a new school building, or in dealing with new social demands. Early intervention to address memory difficulties is important to a child's success after a traumatic brain injury.

Attention and Concentration

Brain injuries also often affect the child's ability to attend and concentrate. The student is likely to experience problems focusing and sustaining attention for long periods of time. A student may not fully comprehend a direction because he/she is unable to filter out distractions in the classroom or may have difficulty functioning in situations where there is a great deal of stimulation. Since the student cannot selectively attend to important stimuli, he/she may "overload" quickly and can become quite agitated or confused. Attention problems may also affect the student's ability to shift from one topic or activity to another. After brain injury, a child may be able to process only small amounts of information. When given too much, he/she may stop processing completely and therefore miss information.

Executive Functions

Executive functions have major implications for the child's school performance. Impaired executive functions are most commonly associated with damage to the frontal lobes of the brain (Luria, 1973 in Ylvisaker, Szekeres, 1989). This is an area commonly affected in closed head injuries.

"A student with executive functions impaired may have difficulty setting appropriate goals, planning and organizing behavior to accomplish tasks, monitoring and evaluating behavior."

Executive function deficits may include the following:

- ❑ Setting realistic goals: the student often lacks the self-awareness necessary to establish realistic goals.
- ❑ Planning and organizing behavior: the student is often unable to identify and organize the sequence of steps to reach a goal.
- ❑ Initiating a task: the student may have the skill to carry out a task but has difficulty initiating the activity.
- ❑ Self-inhibiting: the student may be impulsive or unable to inhibit inappropriate statements, emotions, or behaviors creating social and behavioral difficulties.
- ❑ Monitoring and evaluating performance: the student may be unable to adequately monitor his/her behavior in learning or social situations. Often the student is unable to objectively predict the outcome of the behavior, evaluate what he/she has done, or understand the effect of this behavior on another person.
- ❑ Problem solving: the student may have difficulty in perceiving the nature of a problem and considering a variety of possible solutions. It is common for students with TBI to consider only one possible solution to problems and to fail to consider relevant information in weighing the merits of possible solutions. Students may revert to methods of problem solving such as trial and error which are typical of younger children and less efficient than expected for their age and academic level. (Ylvisaker, Szekeres, 1989)

Executive system impairments also include difficulties in transferring newly acquired skills to alternate settings. Transference of skills should be a planned process. This reinforces the need to assess and teach skills to students with TBI in environments in which the skills will be used.

Speech and Language Effects

Speech problems evident early after brain injury, such as lack of speech or extremely slow speech, often improve significantly in the early stages of recovery. If speech problems persist, they may include speaking in monotone, slow rate of speech or imprecision in articulation. However, most children with brain injury recover motor speech functions (Ylvisaker, 1986).

While vocabulary often recovers to preinjury levels, over time problems with new learning may have a pronounced effect on vocabulary development. Students with TBI, however, usually have ongoing higher level language and communication problems which can have consequences for academic and social success.

In expressive language, difficulties in confrontation naming (naming things or people upon visual presentation) and word retrieval (coming up with the names for things or people in spontaneous speech) are common, particularly under stress. There is usually a sharp deterioration in written and verbal communication as the amount of information to be expressed increases. Short responses or sentences may be adequately spoken or written whereas extended descriptions or narratives may be extremely disorganized.

Comprehension of spoken language by children with TBI often deteriorates sharply with increases in:

- ❑ the rate of speech;
- ❑ the amount of information to be processed (beyond sentence length);
- ❑ the abstractness of the language spoken; and
- ❑ interference from the environment (such as a busy classroom or hallway or noisy, active lunchroom).

Social communication may be greatly affected after a brain injury. The ability to participate appropriately in conversation requires the use of cognitive, linguistic, and social skills, many of which are affected following TBI. These include sustained attention to shifting topics, accurate perception and interpretation of social cues, retention and integration of information already presented, organization of ideas, retrieval of words to accurately express ideas, and application of rules of social appropriateness. As a result, disorganized, tangential, or socially inappropriate conversation is common in students with traumatic brain injury (Ylvisaker, 1986).

"Students may produce language that is inappropriate to the setting (because of impulsiveness or impaired social judgment), wander unpredictably in conversation, fail to initiate interaction, or have difficulty inhibiting or terminating interaction. These common difficulties in the pragmatic domain of language easily cause the child with a traumatic brain injury to seem "different"—socially awkward—and to lose friends" (Burns, et. al., 1988).

Students with TBI may score adequately on commonly used standardized tests of language. However, because of the functional nature of the speech and language impairments experienced by children with TBI and the effects such difficulties have on social and academic success in school, the assessment of communication must combine formal speech and language evaluations with structured observations of the student's comprehension and communication skills in a variety of daily activities, situations, and settings (Ylvisaker, 1986).

Complicating Factors

Amid these cognitive problems, children often maintain some skills and information acquired prior to the injury. ***Preserved abilities*** such as general information and vocabulary may be misleading to educators and give the impression of higher level cognitive abilities while major learning process difficulties exist.

". . . effects of the brain injury occurring before the cognitive functions fully develop may not become apparent until a later age."

Traumatic brain injuries in children can have ***delayed effects*** on cognitive functions. Some difficulties become apparent only as the child continues through developmental stages and has new and different educational demands. Therefore, effects of the brain injury occurring before the cognitive functions fully develop may not become apparent until a later age. The potential for these emerging effects must be closely monitored. For example, abilities in planning and problem solving are usually quite undeveloped in early childhood. Cognitive difficulties in these areas may not become apparent until the student is older and would be expected to have these skills more developed.

Behavioral Effects

Traumatic brain injury often has a pronounced effect on a student's behavior. Many times the changes reflect an exacerbation of challenging behaviors the child had prior to the injury. There are other behaviors that may occur as a direct result of the injury and as such are new responses for the child.

In general, behavior changes in children with TBI can result from:

- ❑ neurological damage to the brain
- ❑ cognitive-communicative problems
- ❑ feelings of failure and frustration that lead to acting-out or withdrawal
- ❑ situations that are overly demanding, confusing, or stimulating
- ❑ preinjury behavior problems.

Difficulties that can result from physical injury or resulting chemical imbalance in the brain include agitation and irritability, mood swings, hyperactivity, and apathy. Emotional and behavioral outbursts may seem to be unprecipitated by events in the environment and may not be under the child's direct control. Disruptions in the brain following an injury can also cause changes in a child's activity level. Some children may display a high degree of agitation with impaired concentration and attention. Others have pronounced lethargy with great difficulty initiating activities.

In some children cognitive effects after brain injury are reflected as behavior difficulties. Problems in initiating activities can be misinterpreted as obstinence, lack of motivation or laziness (Mira et. al, 1992). An inability to filter out distractions and maintain attention to the situation may result in a student failing to follow teacher's instructions, talking out of turn or interrupting others. Students with preserved skills in some areas and gaps or delays in other areas may be characterized as "manipulative" due to their variable performance.

A student's difficulties with attention, concentration and organizational skills can result in low self-esteem or frustration and acting-out behavior. Cognitive difficulties can also result in problems in peer and family relations. Disinhibition and poor self-monitoring, difficulty interpreting social cues, disorganization, impulsiveness, and difficulty interpreting others' intentions often create challenges for the child with TBI in social situations. The behavioral and cognitive controls which children learn to help them behave appropriately are impaired in many children with TBI. Their impulsivity and poor attention to social cues may result in types of behavior in which they would not have engaged before the injury. For example, many children go through a stage of recovery during which they may swear at or insult family and friends, often being unable to suppress or inhibit those responses. For many children with TBI the subsequent behavioral and social difficulties have the most debilitating effect and often greatly impede successful school and community reintegration.

"The behavioral and cognitive controls which children learn to help them behave appropriately may be impaired as a result of TBI."

Some children react to their post-injury state by denying that there is any change from before the injury (Mira et. al, 1992). They may deny or minimize physical or cognitive limitations and make plans which are inappropriate in light of their injuries. Efforts to "convince" them of their impairments are met with ever-increasing denial. In some cases, this denial reflects a cognitive inability to judge their own performance or realistically evaluate their capabilities. Injury to certain areas of the brain can lead to a syndrome that prevents, to varying degrees, development of an awareness of impairment. The child may also deny impairments when faced with an altered sense of self and vision of the future and may benefit from counseling to address these issues.

Psychosocial problems in children with TBI are extremely complex. The injury-related behavior problems, social difficulties stemming from cognitive deficits, possible social isolation, and personal and family problems which may result from coping with the injury create the need for the school and family to work closely to understand and address these areas as early as possible. Social and emotional problems from TBI are discussed in more detail in a later section.

Sensory Effects

Brain injury can cause complex visual disabilites such as double vision and impaired coordination of both eyes. In some cases the brain's visual processing areas are injured resulting in visual field cuts, or partial losses of vision. However, because the brain attempts to "fill in" missing areas, the individual may feel he/she is seeing completely (Savage, 1988). These students can have significant reading problems (e.g., words or parts of words can be cut off). Students may also experience difficulty reading the chalkboard or charts. Comprehensive assessments of visual functions are important to identify any special problems experienced by children with TBI and the need for classroom accommodations or visual aids. Young children in particular are not adept at identifying losses in their visual field. A screening for visual ability is an important part of early assessment and should be considered for all students with TBI. Consultation with a vision specialist is recommended if visual problems are suspected.

Hearing loss is also a common outcome of traumatic brain injury in children. An acceleration-dependent injury to the head can cause hearing problems due to damage to the external ear, the middle ear, the inner ear, the auditory nerve, or the auditory center of the brain resulting in conductive, sensorineural, and/or cortical hearing impairments.

A complex problem results when students suffer cortical type hearing impairments. When the central auditory processing area of the brain is affected, the child is unable to interpret the auditory signal correctly (Savage, 1988). Due to the damage, the auditory information is misinterpreted by the brain and comprehension is disrupted. With this type of injury the student may think he/she is hearing correctly. Careful assessment and monitoring of potential hearing problems in children with TBI should be provided.

Motor and Physical Effects

Motor skills often recover to a point where normal independent functioning occurs following a brain injury. In some cases, however, motor recovery can plateau, leaving some long-term motor problems. Difficulties with balance, gait, strength, range of motion, and coordination may continue.

Fatigue and lack of endurance are very frequent after TBI. Children often tire very quickly and may be unable to persist on a task. Sharp reductions in the child's cognitive processing abilities, such as attention and concentration, at various times during the day are often indicative of neurologically-based fatigue. Simply recommending that the child go to bed earlier at night may not improve this type of intermittent fatigue. Frequent changes to less demanding activities and rest periods are usually necessary.

A small percentage of students with TBI may also develop seizures (Chamovitz et. al., 1985). Seizures may develop soon after the injury or may emerge months or even years later. Some may be precipitated by fatigue. In most cases the seizures can be controlled through medication and some students return to school on anticonvulsant medication which may affect attention and concentration.

Headaches commonly occur following a brain injury. Parents and school staff should be alert to this and monitor for any changes in the severity or frequency of the headaches.

Occasionally students with TBI have difficulties maintaining a consistent body temperature. With changes in environmental temperatures the student may have difficulty adjusting and maintaining body temperature. This condition often disappears after weeks or months but may persist in some cases, and requires careful monitoring of the child and environment.

It is important for school-based health staff to consult with the student's physician to determine the need and extent of monitoring for medical conditions related to TBI and the appropriate procedures to be taken for each student.

Summary

Although the areas of potential problems following brain injury were discussed separately, the interrelatedness of cognitive, language, social/behavioral, and motor difficulties has a significant and complicating effect on the student's success at school. An understanding and appreciation of, for example, the effects of cognitive problems on behavior and social interactions and the implications of behavioral and physical difficulties such as distractibility and fatigue on academic abilities, are fundamental to the assessment, planning, and program implementation for children with TBI. See Appendix C for additional information on possible cognitive problems following traumatic brain injury.

Key Points

- ❑ **Each student with TBI has a unique pattern of abilities and deficits.**
- ❑ **Initial physical effects of injury often resolve quickly. Long-term cognitive, behavioral, and sensorimotor difficulties are often present.**
- ❑ **Memory, attention, and executive function difficulties are common.**
- ❑ **Slowed processing of information is common.**
- ❑ **Preinjury skills may be preserved but are not predictive of new learning abilities.**
- ❑ **Psychosocial problems are complex and often the most debilitating.**
- ❑ **The relationships among cognitive, communication, social, behavioral, and physical difficulties have significant and complicating effects on the student's school success.**

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What are the Special Considerations in Conducting Assessments for Students with Traumatic Brain Injury?

Effective educational planning for all students with special needs requires careful and comprehensive assessment to identify skills and areas of need. For students with traumatic brain injury, there are special reasons for taking creative approaches to conducting frequent and comprehensive assessments. This information is important in identifying the need for special education services and developing an appropriate Individualized Education Program (IEP). The Committee on Special Education (CSE) or the Committee on Preschool Special Education (CPSE) and the education team need to be aware of the special considerations in conducting assessments for students with TBI.

- ❑ "Students with TBI may have an unusual profile of abilities and needs based on recovery of knowledge and skill acquired before the injury combined with injury-related deficits which negatively affect school performance but which may not be detected on tests.
- ❑ "The consequences of frontal lobe injury are typically not detected by commonly used tests of intelligence, academic performance, and language competence.
- ❑ "Ongoing neurologic recovery may invalidate assessment results much more quickly than is the case with students with congenital impairment, necessitating more frequent assessments.
- ❑ "Certain types of injury may have delayed consequences, again requiring special alertness in assessment.
- ❑ "TBI is associated with inconsistent performance, which may invalidate test performance on a given day.
- ❑ "Students may react unpredictably to being back in school - positively or negatively - requiring special thoughtfulness in interpreting test results." (Ylvisaker, 1993)

"A crucial step to ensure a successful educational experience for a child with TBI is the implementation of a specifically designed approach to assessments."

A crucial step to ensure a successful educational experience for a child with TBI is the implementation of a specifically designed approach to assessment. The transition of a child to school requires careful planning and the identification of skills, knowledge, and capacities as well as deficits. Effective assessment of students with TBI entails a variety of strategies to determine the nature of abilities and difficulties and the impact of these factors on the child's day to day functioning in actual school and home experiences.

Children returning to school following a traumatic brain injury may appear to have made good recovery. Physical functioning often improves consider-

ably, speech may be intact, and some preinjury skills are retained. This is often misleading and can belie serious cognitive, sensory, and self-regulatory deficits resulting from the brain injury. A broad based assessment of abilities is needed which includes a combination of standardized testing, formal evaluations, a review of information (e.g., medical information, preinjury information) and observations of the student in actual instructional and social settings in order to formulate an effective plan.

Need for a Comprehensive Assessment

In many cases traditional school assessments (including intelligence and achievement tests) measure academic skills and information acquired prior to the child's injury (Burns et. al., 1988). The assessment of these preserved abilities, although extremely important in establishing a comprehensive profile of the child, may not reflect a variety of potentially impaired cognitive skills. In children with TBI, while much previously acquired information is often intact, learning and retaining of new skills and information is frequently seriously disrupted (Ewing-Cobbs, Fletcher, 1987). The results of these traditional evaluations will overestimate the child's abilities for school achievement. For example, on reading achievement tests, students may perform at grade level, even though they have cognitive deficits which affect their ability to comprehend large amounts of detailed information. The result can be that the reading achievement test score may not be reliable in predicting that the student will be able to read and comprehend a social studies text written for that same grade level.

"Students with TBI often have a profile of abilities with gaps of knowledge or skills within a specific content area."

Traumatic brain injuries in children often result in chronic and subtle deficits in naming and word retrieval, verbal organization beyond the sentence level, comprehension of rapidly presented or large amounts of verbal information, comprehension of verbal abstractions, and effective conversation. These deficits may be underestimated or go undetected in tests relying on overlearned verbal material and those given without time limits.

Students with TBI often have a profile of abilities with gaps of knowledge or skills within a specific content area. Therefore, it is often useful to examine abilities and deficits below basal and above ceiling levels on standardized tests. It may also be useful to use standardized tests to determine cognitive or processing areas which have a particular effect on the student's performance. Once the standardized test has been administered to the student for norm referenced comparisons, the administration of the test can be modified to assess cognitive areas which may affect performance. For example, the information on the test page may be decreased to determine if issues of confusion or organizational deficits affect accomplishing the tasks. Additional time can be given to help identify problems with slow processing of information.

Baxter, Cohen and Ylvisaker (1985) also suggest other possible test modifications to focus on cognitive areas including:

- "Allowing the student to use different response modes, such as saying, pointing to, or looking at an answer instead of underlining or writing it.
- "Changing the directions and content of test items: make them shorter, *less wordy or more concrete (by adding print or pictures)*, or present them orally instead of in writing or vice versa.
- "Giving examples to clarify the tasks.
- "Substituting multiple choice responses (oral or written) for those that involve recalling information from memory.
- "Enlarging the print of the tests."

It is important that all modifications of standardized tests be documented so that the specific conditions under which the student performs are known and misinterpretations of students' abilities are avoided. For students with disabilities, testing modifications should be documented in the student's IEP.

In addition, the circumstances of the controlled testing environment, necessary for collecting certain diagnostic information, may compensate for or mask other functional problems that may interfere with classroom performance.

". . . the circumstances of the controlled testing environment . . . may compensate for or mask other functional problems that may interfere with classroom performance."

The formal evaluation setting may not adequately capture the problems presented in less structured real-life situations (Baxter, Cohen, Ylvisaker, 1985). For example:

- "a controlled and distraction-free environment may compensate for the student's attentional deficits;
- "the use of short tests and relatively brief testing sessions may compensate for reduced endurance, persistence, and attention span;
- "very clear test instructions and examples may compensate for reduced task orientation and impaired flexibility in shifting from task to task;
- "highly structured tasks may compensate for reduced initiation and problem solving." (Burns et. al., 1988)

As part of the CSE or CPSE evaluation, a comprehensive and meaningful assessment for a student with TBI must incorporate information from observations and interactions in the actual classroom setting and typical school environments. Assessment within the student's real-life settings can address the level of ability, functional deficits, and student interests. Such assessments should occur on an ongoing basis rather than as a one time or annual function.

Many areas can be appraised through observation of the student in actual school activities such as the:

- ❑ student's ability to focus and sustain attention, organize information, initiate tasks, problem solve, comprehend verbal and written directions;
- ❑ student's endurance and need for rest periods;
- ❑ need to modify noise levels or other classroom distractions;
- ❑ need to modify the daily schedule (child may be better able to handle morning activities) or length of sessions;
- ❑ benefits of location in the classroom to address visual or auditory difficulties;
- ❑ student's abilities or problems in social situations; and
- ❑ student's communication efficiency.

". . . hypotheses testing is a useful approach . . . "

In order to focus on the actual school and functional problems the student experiences and to assist in developing goals and strategies to address the areas of difficulty, hypotheses testing is a useful approach. Based on initial observations and evaluations, staff develop hypotheses of key areas of the student's cognitive skills and deficits, formulate key questions to focus on the specific functional area and establish controlled observations of these behaviors. Following are questions the education team may want to consider:

SCHOOL-BASED OBSERVATION QUESTIONS

- Does the student begin assignments independently or are cues needed to get started? How detailed or complex do the cues need to be?
- Does the student need to be reminded to stay on task? How often?
- Does the student get lost or confused trying to go from one classroom to another room, even if surroundings are familiar and the route is taken daily?
- Is the student able to follow directions? What type of directions are most easily followed? How complex may the directions be?
- What is the rate at which the direction must be given so that the student can process it successfully?
- Does the student often forget to do things that he/she has been asked to do, even after several reminders?
- Are assignments incomplete or do they contain errors which appear to be "careless?"
- Does the student have noticeable difficulty comprehending new concepts in math, social studies, etc.? Is frequent repetition and concrete demonstration required for new learning to take place?

continued on next page

(School-Based Observation Questions, cont'd.)

- Does the rate of learning and performance seem reduced?
- Is the student's memory for knowledge acquired prior to traumatic brain injury inconsistent and unreliable (e.g., basic math facts)?
- Does the student display different behavior than before traumatic head injury? If so, how—more outgoing, withdrawn, distractible, etc.? Does the student make inappropriate comments or make comments at inappropriate times, e.g., comments which are developmentally immature and below his/her age such as laughing inappropriately?
- Does judgment regarding safety seem poor?
- Does problem-solving ability, both academically and socially, seem reduced?
- Does the student demonstrate mental fatigue and/or confusion? (Missouri Department of Education, 1987, p.5)

Preinjury Considerations

An additional consideration in evaluating children with TBI is information on the student prior to the injury including learning style, academic profile, behavior, and interests. Comparison of the student's behavior before and after injury is important in highlighting the changes that have occurred, both those directly related to injury effects and in reaction to them (Fryer, Lehr, Savage, 1988).

A student's school history, such as past standardized test records, history of learning or behavior difficulties, past placement in special classes, past assessments, etc. should be reviewed to obtain a preinjury profile of the student. Records should be supplemented with discussions with the student's teachers to gather information about the most recent school performance, interests, behavior and to obtain copies of the student's own materials to be used in information evaluation.

Family Information

The input of parents is invaluable regarding a student's prior and current abilities, functioning in familiar settings, social-emotional concerns, interests, and other concerns that impact the family. The family can also alert the school to emerging problems and improvements.

Medical Information

To form a clear picture of a student with TBI, it is important to have such basic medical information as the location and extent of the lesions, degree of trauma from a medical perspective (mild, moderate, severe), age at the time of injury (many students are referred with "old" injuries), length of hospitalization, continuing medical problems, sensory or perceptual deficits (e.g., visual-perceptual), and whether the child is taking medications.

Also to be considered are the effects of medication. Often children with TBI receive ongoing care for their medical conditions or injuries requiring medication. For example, in some cases, seizures may occur after a traumatic brain injury requiring anticonvulsant medication. Some medications may affect the child's school performance causing fatigue, attention problems, or other cognitive effects. The effects of medication must be considered in the assessment process (Telzrow, 1991).

Neuropsychological Evaluation

The education team, the CSE or the CPSE may determine that there is a need for a neuropsychological evaluation. A neuropsychological evaluation, conducted by an individual trained in TBI, can help educators form a more complete picture of a student's abilities by providing a description of a range of cognitive deficits and strengths.

A neuropsycological battery can provide information on the following cognitive areas:

- ❑ Organizational skills;
- ❑ Intellectual functioning;
- ❑ Sensory and perceptual functioning;
- ❑ Language comprehension and expression;
- ❑ Attention, concentration, and alertness;
- ❑ Problem solving and judgment;
- ❑ Flexibility of thought process;
- ❑ Memory;
- ❑ Rate of information processing;
- ❑ Sequencing ability; and
- ❑ Temporal and spacial abilities.

(Baxter et. al., 1985)

The education team should work closely with the neuropsychologist to discuss the findings of the evaluation in terms of their implications for the student's functioning in school and at home. This information can be used by the team in observations and interactions in the school environment to develop a comprehensive view of the student and for program planning.

It is important to note that a determination of a student's need for a neuropsychological evaluation must be made on an individual basis, but is not automatically required for every student classified or suspected of having a traumatic brain injury.

Frequent Assessments

Students with traumatic brain injuries often experience significant neurological changes in the initial 12 to 18 months of recovery. Such changes can proceed possibly for years. Also, some behavioral or learning impairments may not become apparent until years later. With maturity, impairments in complex functions may become more evident. Since the degree and the areas of recovery cannot be predicted in individual cases, periodic, frequent and ongoing assessments of the child's abilities are recommended. Such frequent assessments would not necessarily include all components of a comprehensive assessment; however, regular monitoring of progress and the effectiveness of interventions is essential.

Summary

Planned and structured observation of the student with TBI in everyday activities provides necessary information on the child's skills, deficits, interests, and priorities to supplement information available through formal, standardized testing. Areas which most seriously affect functioning in school tasks can best be identified in this manner.

With the development of comprehensive assessments as described above, school personnel can understand the student's strengths and interests and accurately determine potential areas of difficulty for planning appropriate programs and be responsive to changing needs.

Key Points

- **Assessments should include observations and interactions in real-life environments as well as formalized testing.**
- **Children with TBI often have significant difficulties in new learning despite normal scores on intelligence tests.**
- **Circumstances of the individual testing situation may mask key functional difficulties.**
- **A student's preinjury educational profile must be considered.**
- **Parents are an essential resource for current and ongoing information on the child's needs, abilities, and progress.**
- **Frequent and ongoing assessments are often needed to account for changing needs and abilities.**

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Why is Traumatic Brain Injury an Educational Disability?

While many students with TBI are able to have their educational needs met in general education, some students require special education services. In October 1990, the Individuals with Disabilities Education Act (IDEA) was amended to include "traumatic brain injury" as a disability category for students requiring special education services. Effective January 8, 1993, Part 200 of the Regulations of the Commissioner of Education was amended to include a definition of traumatic brain injury as a disability classification as follows:

> Traumatic brain injury means an injury caused by an external physical force or by certain medical conditions such as stroke, encephalitis, aneurysm, anoxia or brain tumors with resulting impairments that adversely affect educational performance. The term includes open or closed head injuries or brain injuries from certain medical conditions resulting in mild, moderate or severe impairments in one or more areas, including cognition, language, memory, attention, reasoning, abstract thinking, judgment, problem solving, sensory, perceptual and motor abilities, psychosocial behavior, physical functions, information processing, and speech. The term does not include injuries that are congenital or caused by birth trauma. (8NYCRR 200.1(mm)(12))

Key Elements of this Definition

Traumatic Brain Injury (TBI) includes injuries caused by external physical forces and certain medical conditions that affect the brain. The medical conditions included in the definition of TBI are not intended to represent an exclusive list of medical causes, but are examples of such conditions. These examples which include stroke, encephalitis, aneurysm, anoxia, and brain tumors are defined in Appendix B.

The results of a traumatic brain injury must adversely affect educational performance to qualify a student for special education services. The full impact of TBI on school performance may not be evident immediately after an injury. Therefore, schools should carefully assess a student's learning process (e.g., memory, attention, concentration, executive functions) and problems with new learning to anticipate needs and provide supports to students. Schools should monitor students for emerging problems that will affect ongoing educational performance.

Based on the evaluation process, the CSE or CPSE may determine in some cases that the student is not eligible for special education services. Even if a student with a brain injury has been determined not to be eligible for special education services under the IDEA, he or she may be eligible for services under Section 504 of the Rehabilitation Act of 1973 if the student has a "physi-

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cal or mental impairment which substantially limits a major life activity." If a child is handicapped as defined by Section 504, he or she is entitled to accommodations in the regular classroom. Such students will probably need support in the general education environment which might include instructional adaptations (e.g., modifications of class schedules, adjusted placement of the student within the classroom, use of a computer for written work), speech and language improvement services, and other educationally related support services. A copy of the evaluation results and the recommendations should be sent to the principal of the child's school.

The impairments in the areas listed in the TBI definition above may be mild, moderate or severe. It is usually the combination and complexity of these impairments which leads TBI to significantly affect a student's educational performance.

TBI as defined above excludes congenital and birth trauma injuries. The disability category of TBI is intended to address the unique features of an acquired disability.

Students with Traumatic Brain Injury Differ from Students with Other Disabilities

No two students with brain injury are alike because each injury results in a unique profile depending on the location and extent of the injury and the age of onset. Within this disability classification there is a great deal of diversity with regard to severity of deficits, types of skills and problem areas, and intellectual functioning among students. However, students with TBI differ from students with other disabilities in the onset of the disability, the complexity, and the recovery process.

TBI is an acquired disability:

The problems exhibited by children with TBI are the result of an often sudden, traumatic interruption of a generally normal life and school career. A child with a TBI often retains prior intellectual functions in various academic skill areas while experiencing significant deficits in other areas. Previously learned skills and information may return, while new learning is usually significantly impaired. Problems in school often do not emerge until new learning is required. Children injured at an early age often experience long-term school problems because they lacked an established knowledge base at the time of injury.

In addition, there is usually a marked contrast between a student's pre- and post-injury capabilities. Students may remember how they were before the accident and this often leads to depression, anger, and frustration. Previous learning styles can interfere with developing new learning strategies necessary to compensate for cognitive and sensory deficits. For example, a previously gifted child may resist suddenly needing to use notes; a child who was a strong auditory learner may be ill-equipped to cope with an auditory processing deficit.

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TBI is marked by complexity:

Students with TBI often present very complex profiles of abilities and disabilities. They often show marked variations in intellectual abilities between and within different areas resulting in a profile of abilities with gaps of knowledge (Cohen et. al., 1988). For example, a high school student may retain higher level skills (such as algebra) but cannot perform a lower level skill (such as multiplication). A younger child may be able to read, but cannot tell what day or month it is. The retention of old learning is complicated by problems with new learning.

A tramatic brain injury affects a number of areas (physical, cognitive, communicative, memory, social, behavioral). In TBI, a difficulty in any one area is often interrelated to effects in other areas. Students may perform adequately on formal tests, yet experience problems in educational and other settings. A student may have preinjury preserved knowledge (specific knowledge and skills retained) yet experience difficulties in executive skill functions associated with frontal lobe injury (self-awareness, goal setting, planning, self-initiating, self-inhibiting, self-monitoring, and problem solving) which affect the student's ability to apply and use his/her knowledge and skills. Most often a student will experience difficulty in integrating and generalizing information.

Students often demonstrate inconsistent patterns of performance. In addition, the fact that the effects of a brain injury may not become evident until a later developmental phase further complicates the profile of any one student (Cohen et. al., 1988).

Recovery from TBI is a process, not an event:

Recovery from TBI can be extended and unpredictable. Neurological improvements can occur for months or even years. Early dramatic improvements are often the result of recovery from secondary injuries (e.g., swelling, bleeding). Physical recovery which may occur rapidly cannot be equated with overall recovery as there are often long-term cognitive, social, and behavioral consequences of a brain injury. Improvements can proceed indefinitely, but often slowly over many years. However, even as improvements occur, new difficulties may emerge as the child faces new developmental challenges. Social and emotional difficulties resulting from a traumatic brain injury can develop years later. In children treated with cranial radiation, the cognitive and learning problems may not emerge for one to five years after treatment. Change in a student's abilities is a key characteristic of TBI.

"Change in a student's abilities is a key characteristic of TBI."

Summary

Students with traumatic brain injury demonstrate many similarities with other disability categories. Many of the assessment and teaching strategies used with other students are relevant for many students with brain injury. However, students with TBI have those unique characteristics, as described above, which require educators to approach assessment, IEP development and reviews, and program planning with a somewhat different focus.

For students with TBI, schools should ensure that:

- ❑ Information and staff training on TBI is provided on the effects of brain injury on learning and behavior.
- ❑ A student is monitored over time for emerging problems.
- ❑ Frequent reviews are conducted to adjust a student's educational program as the student's needs change.
- ❑ Assessments of students with TBI go beyond the standardized tests and include observations and interactions in classrooms and other settings to identify functional skills and deficits.
- ❑ Service coordination occurs with a well-informed team to address the complex and interrelated problems of students with TBI.
- ❑ IEP goals and objectives for students with TBI include "executive system" abilities such as organizing, planning, and initiating.

KEY POINTS

- ❑ **Many students with TBI will be able to have their educational needs met in general education but may require support and long-term monitoring.**
- ❑ **Traumatic Brain Injury is a disability category for students requiring special education services.**
- ❑ **New York State's definition includes TBI caused by external physical forces as well as certain medical conditions.**
- ❑ **Students with TBI differ from students with other disabilities in the onset, complexity, and recovery process of the disability.**
- ❑ **Assessments, IEP development and reviews, and program planning require special considerations in light of the unique characteristics common to TBI.**

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What Needs to be Considered in School Reentry and Program Planning?

Identifying Students with a Prior History of TBI

Schools can take an active role in identifying students with a history of traumatic brain injury by including pertinent questions in their preschool, kindergarten, and periodic health updates on students.

Screening questions may include:

- ❑ Was the child ever seen in an emergency room or by a doctor for an injury to the head?
- ❑ Did the child ever lose consciousness?
- ❑ After the child was injured, did he/she experience any problems such as difficulty concentrating, remembering, reading, writing, calculating, poor judgment, changes in getting along with others, etc.?
- ❑ Did the child have any other significant illnesses (brain tumors, cancer, meningitis, encephalitis, leukemia, etc.)?

Positive responses to these questions should lead schools to seek further information about the child's history and to closely monitor the student for the effects of TBI.

For some students behavioral and/or academic difficulties in school may be associated with a traumatic brain injury earlier in life. These students may profit from additional supports or services or adaptations in their educational and behavioral programs.

The School's Role with Students with Mild Brain Injuries

The majority of brain injuries are characterized as "mild" from a medical perspective. Mild brain injuries are those in which a child may spend a short time, if any, in the hospital, makes rapid medical recovery, and is sent home without the apparent need for ongoing medical or rehabilitative care (Kay, 1986). While they appear fine, some of these students have difficulties once they return to school (Kay, 1986). Problems in remembering, concentrating, organizing, working efficiently, and in personal relationships can result from mild brain injuries (Kay, 1986). Since the effects of mild brain injuries may not be immediately apparent, classroom behavior and academic performance for these students should be monitored closely, particularly during the initial months after injury. Schools should have established systems in place to document the occurrence of mild brain injury in children. Often the logical entry point for documentation is the school nurse, who is advised of absences and injuries and can obtain information about the circumstances and medical care received. Teachers can be aware that children who have received a concus-

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sion or other mild brain injury may experience recurrent headaches, fatigue, nausea which, while usually temporary, will affect the child's ability to attend and complete schoolwork and homework (Meserve, 1993).

Schools should be alert to the following behaviors that may indicate more serious and long term effects (Ylvisaker, 1993).

Teachers are often the first to recognize changes in learning and behavior and should be particularly alert to:

- ❑ problems in school attendance;
- ❑ inattentiveness, lowered academic performance, slow performance, delayed responses, problems remembering new information, and problems organizing tasks;
- ❑ inappropriate, impulsive, unusual behavior;
- ❑ problems interacting with peers;
- ❑ mood swings;
- ❑ distinct changes in behavior or attitude; and
- ❑ fatigue.

Emergence of any of these behaviors should signal the school that an assessment should be conducted to determine the need for special accommodations or supports necessary to prevent further academic and social difficulties. For example, reduced demands in academic work and increased structure and schedule modifications may have a dramatic impact on the student's success in school after a mild brain injury.

Helping a Child with TBI Return to School After a Brain Injury

For most children with TBI, schools are the key service providers following hospitalization and rehabilitation. Students returning to school following medical recovery often have cognitive, physical, and behavioral problems and difficulties meeting the demands of school. The school can be an ideal setting to foster the child's transition and improved functioning. Schools provide much needed friendships, supports, activities, and learning opportunities. It is the appropriate setting for relearning needed skills and social competence and provides necessary structure and support to address the combinations of complex difficulties and changing needs of the student. A student's return to school must be managed carefully to ensure a successful transition, thus avoiding ongoing failure, frustration, and exacerbated problems.

Because the student's needs are unique and changing, flexibility in planning is essential. School reentry planning must be highly individualized because each student differs in needs, deficits, pretrauma history, severity of injury, and age at which the injury occurred.

The essential ingredients to school reentry and program planning include:

- ❑ Early and ongoing communication with hospitals and rehabilitation centers and involvement in the discharge planning process;
- ❑ Planning for coordination of services;
- ❑ Planning for frequent review of the student's progress;
- ❑ Preparing the student, the family, the staff, and peers for a student's return to school;
- ❑ Interdisciplinary team participation including an active involvement of the student's family;
- ❑ Consideration of the full range of placements, supports, and services in general or special education;
- ❑ Program modifications, supports, and adaptations;
- ❑ Flexibility in program planning and delivery of services; and
- ❑ Agreed-upon reentry priorities for academic, social, emotional, and physical needs. (Mira et. al., 1992)

Communication with Hospitals and Rehabilitation Centers

A student's home school is responsible for the provision of education to the student while he/she is cared for in a hospital or rehabilitation center (NY Educ L Sec 3202.6). This can be provided by the home school district directly, through contract with the school district where the facility is located, by a tutor, or through contract with a school affiliated with the medical facility. In any case, the school district, including the Committee on Special Education (CSE) or Committee on Preschool Special Education (CPSE) should work collaboratively with the hospital or rehabilitation center to plan education services for the child during rehabilitative care.

In addition, information sharing and planning between the school and the hospital or rehabilitation facility should begin well in advance of the student's return to school. For each child, a staff person from the school and the medical program should be identified to be responsible for the sharing of information. The school staff, including the CSE or CPSE should specify the types of information needed to initiate effective planning. This might include reports, evaluations, and other information that have implications for the student's return to the school environment and needed school services. It may also be useful for hospital staff to prepare a videotape of the student that includes (1) a view of the student early in recovery and at the time of discharge to demonstrate the student's changing condition and (2) a demonstration of physical, cognitive, behavioral, and educational practices used by hospital staff. In addition, the school can offer the rehabilitation center or hospital information on the student's preinjury skill levels and instructional materials. A formal process should be developed and agreed upon for the sharing of information between school and the medical facility (Ylvisaker, 1993).

Planning for Coordination of Services

The multiple needs of the student with TBI require the planning and input of individuals representing different disciplines and perspectives significant to the child's return to school. An individual should be identified who can coordinate the input of the team and communicate and work effectively with staff, administration, the family, and the student. An individual responsible to coordinate planning, communication, and services on behalf of the student provides the benefit of a focus for student information to be consistently maintained and shared. The team must have access to information to understand the child's strengths and needs to appropriately coordinate an education program and related and support services. The case coordinator represents the entry point for all outside information about the student prior to and after return to school from medical and rehabilitation agencies. The case coordinator also provides parents with one consistent contact for information and questions and should facilitate rapid responses and decision making by individuals on the whole team. The case coordinator can also assist the team in determining needs for training and consultation on TBI. It is essential for members of the team to understand the effects of TBI and the impact on children's learning and behavior and to integrate this information with their professional expertise. The education team may include teachers, school nurses, special education personnel, related service providers, administrators, the student's parents, the student, and representatives from other programs or agencies as appropriate.

Preparing the Staff, the Family, the Student, and Classmates

The key to a successful return to school is assuring that the necessary supports are in place to maximize social and academic success. The student, the family, the school, and the student's peers must all be prepared for the student's return to school (See Figure 3) (Ylvisaker et. al., 1991).

Preparing Staff

It is essential that staff who will be working with the student be provided general information about traumatic brain injury and an opportunity to address specific questions on the student's needs. Resources on staff training and technical assistance are listed in Appendices E, F, and H.

Assisting Families

It is important that parents be encouraged to participate in school planning meetings and be actively involved in the reentry process. Prior to hospital or rehabilitation facility discharge, parents have focused on the medical recovery of their child and are often unprepared for the new challenges and systems they will face as their child returns to school. For most, the special education system is a new experience for them. Families may need to be provided with information on the committee on special education process, school services and supports available, assessment procedures, and the process of developing and reviewing Individualized Education Programs (IEP).

Because medical recovery has been the focus of the parents' attention up until the point of school return, school staff should be sensitive to the fact that parents may be unprepared for the possibility that their child may experience long-term cognitive, social, and behavioral consequences of the injury.

Figure 3. Components of a Successful School Reentry

"Parents . . .are often unprepared for the new challenges and systems they will face as their child returns to school."

Parents can provide necessary information on the child's skills and needs and functional areas that are important to address when planning the student's return to school and family life. Every effort should be made to involve parents in the educational planning process. In doing so, it is helpful for school personnel to understand what families have experienced in regard to their child's injury or medical condition and to provide support throughout the educational process. Families deal with extreme stress from a child's brain injury or serious medical condition. Even after the child has returned to school, parents are uncertain about what long-term problems the child may have or difficulties he/she will encounter. Parents must deal with the disruption of family life and stress on other siblings and often the demands of continued medical care for their child. Parents of a child with brain injury often must cope with changes in their child's personality and learn to accept not only the loss of the child they once knew, but also the loss of the vision of that child's future.

All families differ in their ability and willingness to participate fully in the education planning process, thus interactions with families are highly individual. However, it is important that educators be sensitive to the family's experience while providing support and sharing information and, to the extent appropriate, encouraging their ongoing participation in the planning process and assisting families in providing suggestions, information, and opinions.

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Siblings should not be overlooked in planning for a student's return to school. A traumatic brain injury to one child affects the entire family. Stress, depression and deteriorating academic performance are common in siblings (Ylvisaker, 1993) (Pieper, 1991). Therefore, schools should be alert to the support and counseling needs of the student's siblings.

Preparing the Student

Visiting school before the student's actual return may help the student to become familiar again with the school environment and to interact with classmates prior to a return to school. The visit(s) can also serve to identify unanticipated problems which require program modification or environmental adaptations. For example, the student may have difficulty orienting him/herself in the school building and a map could be developed to assist him/her.

A student may also benefit from a clear understanding of the grade level and classes he/she will enter, that some subjects may be more difficult than they used to be, and that teachers will help him/her discover new ways to learn.

A student may also need preparation in how to interact with peers and to explain his/her injury. Advance preparation in this area will decrease the student's frustration in not being able to respond appropriately to peer's questions.

Preparing Classmates

For many students, the injury of a friend has a significant impact. To a certain extent, schools can assist students by providing them with general information regarding the student's problems which occurred as a result of the accident. Classmates can be advised regarding how they can help the student. Educational planning should not neglect the student's need for a circle of friends.

Program Planning

The educational placement of and services for a student with TBI should be carefully considered. Children with TBI return to school with a range of strengths and weaknesses. Some children have fairly minor deficits whereas others have serious, long-term disabilities. A traumatic brain injury does not dictate any particular educational placement. Considerations within the full continuum of placements and services are appropriate depending on the needs of the individual child. Many children with TBI can appropriately be placed in the general education setting with support services and environmental and instructional adaptations. For many students, the challenge of returning to the general class setting may initially be overwhelming. For some children, after being in a hospital or in rehabilitation for several weeks or months, homebound instruction may be needed until the child is able to participate in the school setting. In some cases the child may be able to return for only a part-time basis at first. A modified schedule may need to be implemented allowing for breaks to accommodate for a student's fatigue. A highly structured, less distracting setting may also be required for a period of time.

The student's program should be closely monitored and modified as the child's functioning changes and he/she responds to new challenges, instruction, and social situations (Cohen et. al., 1988). Periodic reassessment is essential, particularly during the first year post-injury, and adjustments to the student's program should be expected and implemented to keep pace with his/her changing needs.

Education Plans

For those students who require special education services, the Individualized Education Program (IEP) should address all areas of educational need focusing particularly on the cognitive, behavioral, and psychosocial needs identified through the comprehensive assessment process.

Based on the student's profile, the IEP should identify appropriate goals and short-term objectives in the following areas:

- ❑ The improvement of cognitive processes and development of compensatory strategies in areas such as memory, attention, and concentration.
- ❑ The development of behaviors and social skills for successful school, family, and vocational functioning.
- ❑ The improvement of executive functions in order for the student to learn and behave more independently and effectively. This includes areas such as identifying one's strengths and weaknesses, setting goals, planning tasks, initiating activities, self-evaluating, problem solving, and organizing.

Instruction in curriculum content can serve a dual purpose to improve cognitive functioning. Strategies used in addressing cognitive deficits will be more effective when integrated with actual instruction in academic areas and linked to school activities. This enables the student to develop skills in the context of their desired use and with school-related materials, promoting maintenance and generalization of abilities.

Not all identified problems require immediate intervention. It is necessary to evaluate and determine priority areas to address. Consideration should be given to those that are most interfering with the child's ability to function in school, those that can be resolved quickly or compensated for, those which increase the student's success, and those that are identified as major problems by the student and by the student's family (Malkmus, 1989).

Program Modifications, Supports, and Adaptations

In planning the educational program for the student with TBI it is necessary to analyze the educational environment.

Factors to consider include, but are not limited to, the following:

- ❑ environmental factors (e.g., distance between classes, architectural barriers, distractions in classrooms, etc.)
- ❑ scheduling (fatigue and attention factors may require frequent breaks, shortened period or day, resequencing of academic subjects)
- ❑ adaptations of materials and assistive technology (e.g., communication devices, computers, calculators, tape recorders)
- ❑ staffing needs
- ❑ transportation
- ❑ supports to assist students with organizational skills
- ❑ curriculum expectations and performance requirements (written, spoken, assignments, etc.).

This information should be considered with the student's skills and needs to begin to determine areas requiring supports, modifications, and/or adaptations. These needs are best determined through observations and interactions with the child in actual school settings and related activities.

Planned modifications and adaptations can often minimize the effect of the student's disabilities and promote placement in less restrictive settings (Mira et. al., 1991).

"Planned modifications and adaptations can often minimize the effect of the student's disabilities and promote placement in less restrictive settings."

Supported interventions include the following examples:

- ❑ modified schedule
- ❑ peer to assist in note taking, locating classes, etc.
- ❑ rest breaks
- ❑ teacher provided notes or outlines of unit information
- ❑ tape recorder to assist in remembering lessons and assignments
- ❑ classroom aide for behavioral or academic assistance.

Initially, it is beneficial to provide more intensive support for the student to minimize stress, frustration, and, perhaps, failure.

The functioning of the child with TBI can change, sometimes rapidly, during the early weeks and months following return to school. Unpredictably, some skills may recover while other problems persist. When students with TBI are faced with the demands and intensity of some school tasks or increasing difficulty of school assignments, cognitive impairments which were previously unnoticed may become apparent and supports may need to be implemented. This is particularly evident during periods of transition such as major schedule

changes, placement changes to less restrictive or less structured settings, and grade or school changes. In some cases, behavior problems emerge due to frustrations or increasing socialization difficulties. Therefore, the student's performance must be monitored regularly and program adjustments planned and implemented. Overall, a flexible approach should be promoted to ensure that adequate supports are in place to address a student's changing needs.

KEY POINTS

- ❑ **Questions to identify a history of TBI should be included in preschool, kindergarten, and periodic health updates on students.**
- ❑ **For students with mild head injuries, schools should be alerted to possible changes in learning and behavior.**
- ❑ **A system for monitoring students with certain medical conditions for later emerging problems should be developed upon the student's return to school.**
- ❑ **Return to school must be managed carefully to avoid frustration, failure, and exacerbated problems.**
- ❑ **Because the needs of students with TBI are unique and changing, individual and flexible planning is essential.**
- ❑ **A successful school reentry is one in which the student, the family, the school, and the peers are all prepared for the student's return to school.**
- ❑ **Program planning for children with TBI requires the active involvement and support of the child's family.**
- ❑ **A team of staff with a designated case coordinator working together to plan programs through ongoing communication is recommended.**
- ❑ **A traumatic brain injury does not dictate any particular educational placement.**
- ❑ **The IEP must address all areas of education need focusing particularly on cognitive, behavioral, and psychosocial needs. Strategies to address such cognitive deficits should be integrated with academic instruction.**
- ❑ **The educational environment should be analyzed to identify potential barriers and factors for success.**
- ❑ **Due to changing needs, the student's performance needs to be monitored regularly.**

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What Strategies and Approaches are Effective for Educating Students with TBI?

Students with traumatic brain injury typically return to school with cognitive, sensory, motor, behavioral, and/or social problems that may interfere with successful learning and appropriate social functioning. While these students often make remarkable progress, without the appropriate supports and services, they are at risk for frustration and failure in academic tasks and a diminished self-esteem. Students may need to develop new strategies for learning that compensate for lost abilities.

Schools need to provide the necessary supports, structure and instruction to:

- ❑ improve the student's cognitive processes and compensate for new deficits;
- ❑ help the student learn (or relearn) appropriate behaviors and social skills;
- ❑ help the student adjust socially and emotionally; and
- ❑ help the student acquire curricular content and ensure academic success. (Cohen et. al., 1988)

Teachers must be aware of these four areas as essential to the student's success in school after brain injury, regardless of the level of ability. Objectives in these four goal areas should promote independence and successful functioning in real life situations. "...programs that focus on how students process information may be more important than those that emphasize correct responses. The teacher can introduce compensatory strategies to aid comprehension and the student's ability to perform and thus increase the likelihood of academic success." (Cohen et. al., 1998). Improvements in cognitive functioning can be achieved through specifically designed instruction in curriculum content and the typical activities of a classroom which require social skills, behavioral controls, thinking, and problem solving.

Where Do I Begin?

The first step is to prioritize areas of difficulty to avoid overwhelming a student, which will only lead to confusion and frustration. Limiting the number of areas to be addressed at any one time also promotes a more consistent approach by teachers and other staff.

In determining priority areas to be addressed, the team should consider the following (Malkmus, 1989):

- ❑ What are the areas that most interfere with the student's ability to function in school, home, and community?
- ❑ What are the areas that can be resolved quickly or compensated for easily, and thus, increase a student's feeling of progress and success?
- ❑ What are the areas that the student feels are major problems?
- ❑ What are the areas that the student's family feels are priorities?
- ❑ What are the areas identified by other school staff as priorities?

In addition, the education team must assess and address the demands of the new environments and the child's ability to meet those demands.

The team should consider:

1. What are the new situations or environments to which the child will be exposed (e.g., cafeteria, gym, bus)?
2. What are the activities that will be required in each of these environments (e.g., unlocking lockers, taking notes, bringing materials)?
3. What are the skills the child will need to have to be successful in these environments (e.g., memorize lock combination, organize materials)?
4. What are the skills the child already has?
(Slade, 1984)

In order to coordinate goal areas and intervention strategies, staff from a variety of disciplines need to work together. Frequent and regular planning meetings should be held to facilitate discussion and coordination of the student's education.

Strategies that are selected need to be age appropriate and consistently applied by all staff members and the family. Consistency is a key element to a successful education program (Divack et. al., 1985).

Are There Strategies to Address Cognitive, Behavioral, Social, and Academic Skills?

There are four major educational approaches to be considered for students with TBI to address cognitive, behavioral, social, and academic skills.

These include:

- ❑ Teaching new skills and concepts;
- ❑ Teaching a student to use compensatory strategies;
- ❑ Making modifications to the environment to assist a student to compensate for losses in physical and cognitive abilities; and
- ❑ Making modifications in teaching approaches.

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Although these approaches are applicable to all students, the strategies presented below highlight the priorities and the specialized applications which address the unique factors associated with TBI.

Teaching New Skills and Concepts

New learning is often difficult for students with TBI because of cognitive difficulties in such areas as memory, attention, information processing, and problem solving. Teaching new skills needs to be carefully planned and structured to ensure compensation for cognitive difficulties and consistent application of approaches by all staff and by the family. Skills to be taught may need to be broken down into uncomplicated and manageable steps through task analysis. Teaching approaches that will promote the learning of new skills include modeling of the skill the student is to perform, auditory and/or visual cuing, prompting to shape the student's performance, and reinforcing appropriate responses. Students with TBI often require extensive supported practice with consistent approaches to learn new skills and to apply these skills in varied settings. While the student may require extensive support to learn new skills, independent skill performance without cues and prompts remains the ultimate goal.

Teaching Compensatory Strategies

Some cognitive problems experienced by students with TBI will not be remediated and will require that the student develop strategies to compensate for these problems (Burns et. al., 1988). Everyone uses compensatory strategies such as appointment books, lists, notes, and maps. Compensatory strategies for students with TBI are tools that are essential to their increased independence and success.

"Compensatory strategies for students with TBI are tools that are essential to their increased independence and success."

The use of compensatory strategies for students with TBI should take into consideration the following three principles:

1. Students with TBI may lack awareness of their new deficits and therefore fail to see the benefits of compensatory procedures. Helping a student understand his/her new profile of abilities and needs after the injury may be critical in the success of acquiring compensatory strategies.
2. Because of the unawareness issue and the emotional challenges associated with a new approach to academic tasks, it is often important to have students involved in selecting the procedures that they use to compensate for deficits. More generally, the goal is to help them become strategic in their approaches to learning and not simply have them acquire one or more compensatory behaviors.
3. The use of compensatory strategies must be taught to a student, often requiring frequent instruction and practice until a student can use the strategy independently. (Ylvisaker, 1993)

The education team must determine if the use of compensatory strategies is appropriate for the student (Burns et. al., 1988). For example, some students,

such as very young children or children with severe cognitive deficits, may not understand the purpose of these strategies or situations where they are applicable. Strategies sometimes take a long time to learn and careful consideration of the child's potential to benefit from this approach is essential.

The identification and development of strategies should focus on the use of the student's abilities to overcome areas of needs. In addition, the student is more likely to use or respond to strategies that address areas of personal importance and when the student is involved in selecting the strategy. Careful attention should be given to the kinds of strategies selected to ensure they are age appropriate and not stigmatizing to the student. It is important to recognize that a student's need for compensatory strategies will change over time.

Students with TBI may not automatically integrate or generalize skills to new settings. Strategies should be used in natural settings and applied consistently across settings.

The number and types of strategies introduced should be limited because a student's ability to concentrate and attend is often impaired. Focusing on too many strategies simultaneously may confuse the student. Strategies cannot be so complex that they affect the student's ability to concentrate and attend to learning a task. Students need to practice strategies to the point where their use becomes automatic. The goal is for the student to learn and apply different strategies when appropriate.

On the following page are examples of compensatory strategies students can be taught to use to address cognitive deficit areas. This list is not exhaustive and not all examples are relevant for all students.

COMPENSATORY STRATEGIES

Orientation:

The Student

- *uses a map or written schedule to show him/her where to go.*
- *describes how to get to a location before going.*
- *leaves class early to avoid confusion of hall traffic.*
- *uses an alarm watch or timer set for regular intervals.*
- *uses assignment books.*

Attention/Concentration:

The Student

- *uses color cuing or underlining to focus attention.*
- *requests that teachers repeat instructions slowly.*
- *recognizes and communicates when he/she is presented with too much information at one time.*

Visual/Perceptual Process:

The Student

- *uses a marker to limit the amount of written information on a page.*
- *uses an index card to assist scanning and maintaining his/her place.*

Organization:

The Student

- *uses a notebook to organize schedules, maps, homework, strategies.*
- *uses graphic organizers such as charts, graphs, flow charts, timelines, arrows.*
- *highlights and makes notations in long passages.*
- *uses task organization checklists with sequenced steps.*

Memory:

The Student

- *uses notes, lists, schedules.*
- *uses a tape recorder.*
- *repeats information over and over silently to place it in memory.*

Problem Solving:

The Student

- *uses a checklist to identify alternatives, weigh consequences, and select course of action.*

Self-Monitoring:

The Student

- *uses "self-talk" (e.g., Is the task complete? Was I successful? What do I need for this task?).*

Environmental Modifications

Students with TBI can be assisted in their learning through modifications in the environment, materials, and teaching approaches. The goal for all students should be to gradually decrease the amount of environmental compensation needed at a rate to ensure a student's successful functioning.

Types of environmental compensations include:

- ❑ adaptations to the physical environment (such as preferential seating arrangements, removal of visual distractions, optimal location of classrooms, and decreased noise levels);
- ❑ attention to routines (such as consistent schedules, formats);
- ❑ assignment of personnel to promote consistency; and
- ❑ material adaptation (such as use of assistive technology, large print, etc.).

Examples of environmental modifications are listed below. This list is not exhaustive and not all examples are relevant for all students.

ENVIRONMENTAL MODIFICATIONS

Orientation:

- *Provide for consistent room arrangement, materials, and routines.*
- *Assign a peer to assist student in locating classes, following schedules, etc.*

Attention/Concentration:

- *Build in rest periods to address fatigue and stamina problems.*
- *Minimize visual and auditory distractions in the room (use of a study carrel, limit the number of items on a desk).*
- *Place the student's desk near the teacher.*

Visual/Perceptual Process:

- *Use large print books, visual guides, books on tape.*
- *Arrange preferential seating.*
- *Use adaptive materials such as a lap board to modify the angle of the student's desk.*

Organization:

- *Structure a student's thinking process graphically through timelines, flow charts, and graphs.*
- *Provide two sets of books - one for home and one for school.*
- *Set up a notebook for the student to use for all subjects.*

Memory:

- *Display written rules and assignments.*
- *Provide a written set of questions before reading the material.*
- *Tape record lessons.*

Instructional Modifications

Three types of instructional modifications effective for students with TBI include promoting academic success while addressing cognitive problems, curriculum modifications, and teacher modifications.

Focus on Cognitive Problems While Teaching Academic Content

It is important academically, and to the student's self-esteem, that the student continue to progress educationally with his/her peers to the greatest extent possible. Teachers should approach instruction in subject areas with two goals in mind - teaching the content and addressing a student's cognitive deficit areas. The integration of these two goals is necessary to ensure that the student learn how to learn and apply learning strategies to actual school-related, real-life situations. For example, arithmetic instruction is an ideal opportunity to promote general improvements in problem identification and problem solving. Reading and writing assignments that go beyond one or two paragraphs are an opportunity to focus on general organizational skills or strategies. Instructional interactions often present opportunities to improve the student's executive functions by asking questions related to planning and evaluating his/her performance (e.g., "Is this easy or difficult for you? Why or why not? How well do you think you will do? Why? How do you plan to achieve that goal? How are you doing? Did you do as well as you thought you would? What could you do to improve?") (Ylvisaker, 1993).

Curricular Modifications

Students with TBI often have profiles of abilities characterized by preserved islands of skills and gaps in basal areas (Cohen et. al., 1988). Students may have intact higher level skills but have difficulty performing lower level tasks. For example, a student may be able to complete division problems but not simple addition problems. Testing for students with TBI should include investigation of skills below basal and above ceiling levels. Most curriculum is sequenced based on skill hierarchies, and achievement at a given skill level implies that a student has all the antecedent skills intact. For students with TBI, assumptions cannot be made that antecedent skills are intact or that a student who cannot perform a specific skill has not retained higher level skills (Cohen et. al., 1988). Instruction should be provided to take advantage of preserved higher level skills while practice in lower level skills must be creatively added.

Teaching Modifications

Just as students learn compensatory strategies to address their cognitive problems, teachers need to consider modifications in their teaching approaches to promote successful learning situations. For example, for students with organizational problems, teachers may need to consolidate lengthy directions into steps, provide the student with a list of key words and concepts for lessons being taught, and help the student to organize his/her thoughts by teaching from the concrete to the abstract and use techniques to help the student categorize and associate (link) the material with known material.

Following are examples of instructional modifications to address cognitive problems. This list is not exhaustive and not all examples are relevant for all students.

INSTRUCTIONAL MODIFICATIONS

Orientation:

- *Provide cues to help with transitions "In five minutes, we will be going to lunch."*
- *Cue the student to observe peers.*

Attention/Concentration:

- *Provide cues to the student to look or listen for certain information.*
- *Use short and concise instructions.*
- *Provide verbal, visual, or physical redirection.*
- *Present verbal information at a relatively slow pace, with appropriate pauses for processing time and with repetition if necessary.*

Visual/Perceptual Process:

- *Provide longer viewing times and repeat viewing.*
- *Provide arrows or cue words on a page to orient the student.*
- *Use color or underlining to focus attention.*
- *Use verbal cues.*

Organization:

- *Condense lengthy directions into steps.*
- *Provide a list of key words and concepts for lessons being taught.*
- *Organize thoughts by teaching from the concrete to the abstract.*

Memory:

- *Summarize information as it is being taught.*
- *Couple new information with previously learned information.*
- *Reinforce information presented with pictures or other visual images.*
- *Emphasize information to be remembered.*

Problem Solving:

- *Teach the student steps involved in problem solving.*
- *Use events that occur in the class to help him/her practice problem solving.*
- *Use modeling, rehearsing, and role playing.*

Initiation:

- *Provide cues to the student to begin tasks.*

Unique Issues and Approaches for Behavior Problems of Students with TBI

Behavior changes that emerge after a brain injury are common and, although broadly predictable in some aspects, remain unique to the individual. These changes often cause significant distress to the student, family, and school and require careful intervention and support. Often seen are reductions in self-control, inappropriate social behaviors, impulsive behaviors, distractibility, irritability, lethargy, lack of initiation, and sometimes aggression (Fryer et. al., 1988).

Behavior changes are not always evident until several months after an injury (Fryer et. al., 1988). Behavior problems in students with TBI are often difficult to understand and deal with because they are often interrelated with the social, cognitive, and preinjury characteristics. In addition, some students with TBI have significant frontal lobe damage that may result in a loss of self-control that goes far beyond what would be predicted on the basis of the student's other characteristics and skills (Ylvisaker, 1993). Some students, particularly those injured at a younger age, may fail to develop social and behavioral controls resulting in behavior characteristics of a younger child.

Behavior management plans for students with TBI should incorporate strategies which may include a combination of environmental adaptations, teaching adaptations, and teaching new behaviors.

While many of the behavioral approaches used with other students may be appropriate for students with TBI, particular strategies are emphasized because:

1. Students with TBI often profit most from behavioral interventions which do not rely solely on contingency management (rewards and consequences); and
2. The interaction between cognitive and behavioral problems is significant in students with TBI (Ylvisaker, 1993).

Changing the Environment

Students with TBI have often lost their ability to cope with unstructured, visually and aurally stimulating environments, and confusing situations. They may become distracted, disoriented, or agitated as a result. Environmental adaptations can provide students with the control that they lack internally. For example, support and/or structure within the classroom, cafeteria, locker room, hallway, and bus may be needed since these areas often require the student to process and act on sometimes confusing and changeable situations. Structure and support can be provided by limiting or eliminating those variables that contribute to behavior problems, controlling social situations, and providing increased supervision. For other examples of environmental adaptations to address behavior problems see chart "Environmental Modifications."

Teaching Adaptations

In addition to adapting the environment where appropriate, students can be assisted by reminding them of specific behavioral expectations (rather than using vague terms such as "behave" or "be nice"), providing cues as to appro-

priate behavior ("you need to be sitting"), giving feedback ("your loud voice and raised arms show me you're angry"), and redirecting behaviors. For some students who display inappropriate verbalizations and angry outbursts, frequent redirection may be necessary. Particularly in the early stages of recovery, acknowledging behaviors and redirecting may be a primary type of intervention. Building routines can be effective in assisting a student to establish structure and predictability in his/her day. Typical behavior management approaches alone, such as the use of time-out, escalating consequences and requiring a student to earn privileges, may prove ineffectual with students who do not plan a confrontation, but act from impulsivity, failing to connect actions with consequences or frustration (Meserve, 1993).

> "...traditional behavior management techniques...are often ineffective in modifying the behavior of head injured students in the classroom. This system relies heavily on an individual's ability to pick up cues from the positive actions of others, to understand cause-effect relationships, to remember information, to generalize from one situation to another, and to control impulsive responses or reaction." (Cohen et. al., 1985)

Teaching Appropriate Behaviors

In situations where a student is having difficulty with his/her behavior, one should not assume that the student knows how to act or react in a more appropriate manner. Students with TBI often need to be taught appropriate behaviors. They often respond well to modeling, rehearsing, and cuing as instructional approaches to learning appropriate behaviors. When using reinforcement of appropriate behaviors, students must understand cause and effect relationships and have the memory capabilities to benefit from this approach. Confrontation and delayed consequences such as detention and suspension, are likely to be ineffective for students with TBI. Helping a student identify his/her behavioral "triggers" and removing him/herself from difficult situations can be an effective strategy.

Appendix D provides additional information on educational interventions for students with cognitive needs.

KEY POINTS

- Goal areas for students with TBI should include:
  - improving the student's cognitive processes and compensating for new deficits;
  - helping the student learn or relearn appropriate behaviors and social skills;
  - helping the student adjust socially and emotionally; and,
  - helping the student acquire curricular content and ensure academic success.
- Because of the number and complexity of problems, it is necessary to prioritize and limit the number of areas to be addressed at any one time.
- Instruction to students with TBI should include a combination of teaching new skills and compensatory strategies, and using environmental and instructional modifications.
- Behaviors are often interrelated with the social, cognitive, and preinjury characteristics resulting in complex and challenging behavioral issues for students with TBI.
- Contingency-based behavior management techniques alone are often ineffective in modifying the behavior of students with TBI.

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What are the Social and Emotional Effects of Traumatic Brain Injury?

The social and emotional difficulties often experienced by students with traumatic brain injury are among the least understood, yet the most disabling, effects of the injury for the student. They may also be the most difficult to address since they are often a direct effect of injury to the brain and are compounded by interactions with peers and family and by school problems (Mira et. al., 1992). Social and emotional difficulties associated with traumatic brain injury are not always evident when a student returns to school. They may be masked by more obvious physical or language disabilities and they often emerge as social and school difficulties mount. Therefore, early intervention to address the factors discussed below is essential.

Prior to the injury, students with TBI may have had a clear understanding of their identity and personal expectations ("I am an athlete;" "I am a good student;" "I have many friends"). After the injury a student's perceptions of his/her own intelligence, competence, career possibilities, and social success are often drastically changed. Also, as the student becomes aware of the extent of his/her injury and limitations, self-esteem drops and self-doubt and depression are frequent outcomes (Barin et. al., 1985).

"The social and emotional difficulties often experienced by students with traumatic brain injury are among the least understood, yet most disabling, effects of the injury for the student."

Children with TBI often experience a loss of friendships. Problems with social interactions resulting from cognitive, behavioral, and communication limitations can make maintaining and initiating friendships extremely difficult. Difficulty remembering rules of social interaction, disorganization with maintaining and terminating topics of conversation, reduced comprehension, weak self-monitoring of verbal and nonverbal behavior, such as making inappropriate offensive remarks, all contribute to serious difficulties with socialization. Friends who rallied in support of a student at the time of the injury often drift away when the student with TBI is unable to participate in age-appropriate social events and function independently.

Establishing one's autonomy, sexuality, and testing against authority are all normal developmental characteristics of adolescence. Following TBI, these feelings and conflicts are often intensified due to an adolescent's diminished problem-solving abilities and impulsive behaviors. Unable to participate in normal adolescent activities, a student may become depressed or angry and engage in acting out behaviors.

Some students who have not sustained serious injuries and have mild changes in functioning can experience significant frustrations because they feel their learning ability has changed. It is now harder for them to remember, or to concentrate, or to work quickly. They are less certain of themselves and do not understand the reasons why.

A child's traumatic brain injury can create a great deal of stress within families often dealing with many intense medical, financial, social, and emotional

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issues. A student with TBI may exhibit problem behaviors, impulsiveness, anger, and irritability which can also create difficulties within the family. Family conflicts can also arise because the injury may have dramatically altered the child's ability to function as independently as before. Greater supervision may be required because the child may have physical limitations, impaired judgment, may be a risk taker and/or extremely impulsive. The student's denial or failure to recognize the need for such supervision can create family stress and conflict (Mira et. al., 1992).

Even a student with a relatively good outcome after a traumatic brain injury may feel and contribute to great stress within the family and peer group if previous high expectations for school and career can no longer be achieved. The student may feel depressed and angry at having a changed vision of his/her future.

Counseling

Recognition of the loss of one's former abilities, difficulties in peer and family relations, school problems, and failure of others to understand the cognitive deficits that limit and hinder functioning are serious issues which can be overwhelming and cause great emotional stress for the student. The provision of counseling for students with TBI offers a means of monitoring the student's social and emotional circumstances as well as assisting the student in addressing the identified difficulties. The counselor can assess and monitor the student's social and emotional issues through discussion with other members of the educational team, with the child's family and through observation and discussions with the student. Information on the student's preinjury personality and behaviors is also very important. Social and emotional problems with students with TBI usually emerge over time. The counselor who understands the potential issues that frequently confront students with TBI can monitor for emerging problems and provide early intervention.

"Students with TBI can benefit from a combination of counseling approaches to help rebuild self-image and to approach the challenges of school and socialization with increased confidence and skill."

Students with TBI can benefit from a combination of counseling approaches to help rebuild self-image and to approach the challenges of school and socialization with increased confidence and skill. Students with TBI need ongoing support to cope with their deficits and emerging problems. The counselor can help the student to understand and deal with the emotions, physical effects, and learning problems that are a result of the brain injury. The student should be helped to recognize the areas needing improvement through real life examples and concrete feedback rather than with generalities. At the same time, student's skills, assets, strengths, and likeable qualities can be recognized and emphasized. Students need to be reassured that they can continue to improve, that they can learn to compensate for many of their difficulties and learn new skills.

The student should be helped in setting realistic short-term goals in areas where progress can be made. Goals need to be consistent with what is important to the student and with his/her own expectations. While students with TBI require reassurance and support, they must concurrently learn or relearn social skills and experience success in these areas. A direct approach to learning social skills that emphasizes cuing, instruction, practice, rehearsal, role

playing, and monitoring progress can assist students with TBI in developing positive social experiences. Also of assistance to the student are strategies for use when confronted with decisions, problems, and difficult situations. Teaching strategies may involve developing a simple guide for problem solving, discussing alternatives and consequences, discussing real-life problems the student is facing, and providing feedback to the student on his/her problem-solving progress.

Each school staff person who works with the student with TBI is effectively involved in addressing social-emotional issues. This assurance, support, and consistency is an important adjunct to formal counseling sessions.

Key Points

- **Social and emotional difficulties associated with TBI are not always evident when a student returns to school.**
- **Some students can experience significant frustrations because they feel their learning ability has changed.**
- **The counselor who understands the potential issues can monitor for emerging problems and provide early intervention.**
- **Counseling can address issues related to the recognition of the loss of one's former abilities, difficulties in peer and family relations, school problems, self-awareness, and problem solving.**
- **Students can benefit from a combination of counseling approaches including recognition of limitations, goal setting, support and reassurance, and skill development.**

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Appendix A

Coma Scales

The following is reprinted from *An Educator's Manual: What Educators Need to Know About Students with Traumatic Brain Injury*, edited by Ronald C. Savage, Ed.D., and Gary F. Wolcott, M.Ed. for the National Head Injury Foundation. Reprinted by permission of the National Head Injury Foundation, 1988.

Glasgow Coma Scale and Rancho Los Amigos Hospital Scale

Any injury which disrupts the reticular activating system in the brain stem results in significantly lowered levels of responsivity (loss of consciousness) which is termed coma. The extent of the brain stem injury is estimated by observation of pupillary responses and eye movement which reflect the intactness of the cranial nerve centers as well as by systematic observation of the patient's responses to selected social stimuli. The standard method for estimating responsivity is The Glasgow Coma Scale (Teasdale and Jennett, 1974). This scale rates three types of response: eye opening, best motor response, and best verbal response.

Glasgow Coma Scale

Eye Opening	(E)
Spontaneous	4
To Speech	3
To Pain	2
None	1
Best Motor Response	**(M)**
Obeys	6
Localizes	5
Withdraws	4
Abnormal Flexion	3
Extensor Response	2
None	1
Best Verbal Response	**(V)**
Oriented	5
Confused Conversation	4
Inappropriate Words	3
Incomprehensible Sounds	2
None	1

Coma Scale (Eye Opening + Motor Response + Verbal Response) = 3 to 15.

A combined Glasgow Scale Score of 9 or more is generally accepted as evidence that the injured person is no longer in coma. (Teasdale and Jennett, 1974).

Recovery from a serious traumatic brain injury that is accompanied by coma is a slow process which follows a more or less predictable course.

The Ranchos Los Amigos Hospital Scale (Malkmus, et al., 1980) divides the progressive return of cognitive functions into eight levels as summarized below.

RANCHO LOS AMIGOS HOSPITAL SCALE

Level I.	*No response*: Patient is unresponsive to stimuli.
Level II.	*Generalized response*: Patient reacts inconsistently and non-purposefully to stimuli. Responses are limited and often delayed.
Level III.	*Localized response*: Patient reacts specifically but inconsistently to stimuli. Responses are related to type of stimuli presented, such as focusing on an object visually or responding to sounds.
Level IV.	*Confused, agitated*: Patient is extremely agitated and in a high state of confusion. Shows nonpurposeful and aggressive behavior. Unable to fully cooperate with his/her treatments due to short attention span. Maximal assistance with self-care skills is needed.
Level V.	*Confused, inappropriate, nonagitated*: Patient is alert and can respond to simple commands on a more consistent basis. Highly distractible and needs constant cueing to attend to an activity. Memory is impaired with confusion regarding past and present. The patient can perform self-care activities with assistance. May wander and needs to be watched carefully.
Level VI.	*Confused, appropriate*: Patient shows goal-directed behavior but still needs direction. Follows simple tasks consistently and shows carry over for relearned tasks. The patient is more fully aware of his/her deficits and has increased awareness of self, family, and basic needs.
Level VII.	*Automatic, appropriate*: Patient appears oriented in home or hospital and goes through daily routine automatically. Shows carry over for new learning but still requires structure and supervision to ensure safety and good judgment. Able to initiate tasks in which he/she has an interest.
Level VIII.	*Purposeful, appropriate*: Patient is totally alert, oriented, and shows good recall of past and recent events. Independent in the home and community. Shows a decreased ability in certain areas but has learned to compensate. (Pollack, et al., 1988)

Appendix B

Examples of Medical Conditions That May Lead to Traumatic Brain Injuries

Stroke: A condition with sudden onset caused by lesions of the brain often followed by permanent neurologic damage.

Encephalitis: Inflammation of the brain.

Aneurysm: "A balloon-like deformity in the wall of a blood vessel. The wall weakens as the balloon grows larger, and may eventually burst, causing a hemorrhage." *(TIRR Head Injury Glossary)*

Anoxia: A condition in which brain cells are destroyed due to insufficient oxygen reaching the brain. Anoxia caused by respiratory or circulatory problems may be a complicating factor in other causes of brain injury *(Bryn Mawr Rehab., 1990)*.

Brain tumors: "An abnormal growth caused by cells reproducing themselves in an uncontrolled manner." *(A Primer of Brain Tumors)*

This list includes examples of possible medical conditions as included in the New York State definition of TBI (NYCRR 200.1(12)) that may lead to traumatic brain injury. It is not intended to provide all possible medical causes.

Appendix C

Possible Cognitive Problems Following Tramatic Brain Injury in School-Age Children

Aspect of Cognition	Possible Deficit Following TBI	Illustration of Deficit in a School Setting
Component Cognitive Processes		
attentional processes	■ reduced arousal; sleepiness; ■ difficulty focusing attention and filtering out distractions; ■ difficulty maintaining attention; ■ difficulty shifting easily from topic to topic; ■ difficulty dividing attention between two or more topics or activities.	1. A student may fail to follow the teacher's instruction or comprehend a lesson, not because of a willful failure to attend or an inability to understand, but rather because of an inability to filter out environmental distractions or internal feelings or thoughts. 2. Attentional problems may result in the student talking out of turn, introducing irrelevent topics or responding inappropriately.
perceptual processes	■ difficulty seeing objects in part of the visual field; ■ difficulty perceiving the spatial orientation of objects; ■ difficulty separating the object of perception from background stimuli; ■ difficulty recognizing objects if too much is presented at once or too rapidly.	1. A student may be unable to do otherwise easy math problems if they are presented on a worksheet page filled with other math problems.

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Possible Cognitive Problems Following Tramatic Brain Injury in School-Age Children, cont'd.

Aspect of Cognition	Possible Deficit Following TBI	Illustration of Deficit in a School Setting
Component Cognitive Processes		
memory/learning processes	■ difficulty recalling events from earlier in the day or previous days; ■ difficulty staying oriented to a schedule or to activities; ■ difficulty registering new information or words that have been learned, particularly when under stress; ■ difficulty searching memory in an organized way and retrieving stored information.	1 A student may fail to complete assignments, not because of negligence or lack of desire to comply, but rather because the assignment, if not written or repeated several times, is not remembered. 2. A student may miss classes or do assignments incorrectly because of difficulty remaining oriented. 3. A student may require an unexpectedly large number of repetitions to learn simple motor sequences (e.g., tying shoes), classroom routines and rules, and textbook information. 4. A student may need to be reminded to repeat information over and over in order to place it in memory, and to "search memory" in order to find information that has been previously learned.

Possible Cognitive Problems Following Tramatic Brain Injury in School-Age Children, cont'd.

Aspect of Cognition	Possible Deficit Following TBI	Illustration of Deficit in a School Setting
Component Cognitive Processes		
organizing processes	■ difficulty analyzing a task into component parts; ■ difficulty seeing relationships (similarities/ differences) among things; ■ difficulty organizing objects into appropriate groups or events into appropriate sequences; ■ difficulty organizing information into larger units (e.g., main ideas or themes).	1. A young student, faced with the task of getting ready for gym class, may be unable to break the task into parts and decide what to do first. 2. A high school student may understand each part of a text, but be unable to integrate the information to determine the main ideas and write a short summary. 3. A student may move unexpectedly from topic to topic in conversation because of an unusual set of associations; this may be interpreted as social strangeness or as resulting from a lack of knowledge about the subject.
reasoning/abstract thinking processes	■ difficulty unerstanding abstract levels of meaning (e.g., figures of speech, metaphors); ■ difficulty drawing conclusions from facts presented; ■ difficulty considering hypothetical explanations for events.	1. A student who does well with basic mathematical operations may have great dificulty with their application in solving word problems or with the more abstract relationships involved in algebra. 2. A student may lose the train of conversation when a figure of speech is used (e.g., "She was climbing the walls").

Possible Cognitive Problems Following Tramatic Brain Injury in School-Age Children, cont'd.

Aspect of Cognition	Possible Deficit Following TBI	Illustration of Deficit in a School Setting
Component Cognitive Processes		
problem solving processes	■ difficulty perceiving the exact nature of the problem; ■ difficulty considering information revelant to solving the problem; ■ difficulty considering a variety of possible solutions; ■ difficulty weighing the relative merits of alternative solutions.	1. Having forgotten his locker combination and not having ready access to his homeroom teacher, a student may simply become upset rather than considering carefully who else may be able to help. 2. Students who fail to comprehend a text with one or two readings may not use strategies to enhance comprehension (e.g., outlining the text, underlining key points, asking themselves questions as they read, discussing the text.)
working memory	■ difficulty holding several words or thoughts or intentions in mind at one time.	1. A student may not be able to follow a 2- or 3-step command, even though comprehension of language is adequate; 2. A student may not be able to think about a compensatory strategy (e.g., "I must repeat this information in order to remember it."), and listen to the presented information at the same time.

Possible Cognitive Problems Following Tramatic Brain Injury in School-Age Children, cont'd.

Aspect of Cognition	Possible Deficit Following TBI	Illustration of Deficit in a School Setting
Component Cognitive Processes		
knowledge base	■ recall of pretraumatically acquired information, academic skill, social rules, etc. may have major gaps; islands of preserved high-level knowledge may convey an overly optimistic picture of the student's level; conversely, knowledge gaps at a low level may suggest an overly pessimistic picture of the student's level.	1. Occasionally, a student gains access to pretraumatically acquired knowledge long after the injury. This may lead the teacher to infer that new learning is occurring at a more rapid rate than is actually the case. Alternatively, the inconsistency in learning rates may lead the teacher to infer that the student is often not trying.
executive system	■ difficulty setting goals; ■ difficulty perceiving strengths and weaknesses in an objective manner; ■ difficulty planning activities; ■ difficulty initiating and/or inhibiting behavior; ■ difficulty monitoring one's own behavior.	1. Students who lack even a rudimentary awareness of current cognitive limitations commonly complain about tasks that are at too low a level and about restrictions on their activity that they perceive as unnecessary. 2. Organized studying (knowing how to divide the task, how to check one's understanding, how to organize the information for easy learning) relies on intact executive functioning, rarely found following severe head injury. 3. Students with initiation problems appear unmotivated and are easily categorized by teachers as resistive or as "behavior problems." 4. Students who have difficulty monitoring their own behavior and who do not profit from the feedback of others often behave in a socially awkward way.

Appendix D

Interventions for Students with Cognitive Needs

Selected Aspects of Cognition	Possible Instructional and Compensatory Strategies
attentional processes	■ use clearly defined objectives that are meaningful for the student; ■ use short and concise instructions and assignments; ■ reward on-task behavior; avoid punishing behavior that results from extreme distractibility; ■ use novel, unusual, relevant or stimulating activities; ■ provide well-placed rest periods or breaks to minimize the effects of mental fatigue or stamina problems; ■ closely monitor time of day, medications and fatigue factors; confer with physicians to determine the feasibility of adjusting medication times so as not to conflict with instructional times; ■ be alert for attentional drifts and redirect the student to task when necessary; ■ explore a variety of cuing systems, e.g., verbal cues, gestural cues or signs at the study site that remind the student to stay on task; ■ remove unnecessary distractors in the classroom; ■ use verbal mediation strategies, such as inserting questions within a lesson, directing attention to the task and topic; ■ in therapy sessions, use tasks specifically designed to help the student focus his attention; e.g., simple maze learning tasks or letter/number cancellation tasks, emphasizing speed, accuracy, and the self-instructions that might promote heightened attention to task; help the student to transfer this improved, self-directed attending skill into the classroom environment.

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Interventions for Students with Cognitive Needs, cont'd.

Selected Aspects of Cognition	Possible Instructional and Compensatory Strategies
visual-perceptual processes	■ describe the visual instructional material in concrete terms; ■ provide longer viewing times or repeat viewings when using visual instructional materials; ■ facilitate a systematic approach to reading by covering parts of the page; ■ place arrows or cue words, left to right, on the page to orient the student to space; teach the student to use the cues systematically to scan left to right; ■ provide large print books or use books on tape; ■ move the student closer to visual materials or have the materials enlarged; ■ place materials within the student's best visual field; consult with a ophthalmologist or occupational therapist about possible visual-perceptual problems.
auditory-perceptual processes	■ limit the amount of information presented; give the student instructions or other verbal information in appropriately small units; ■ present verbal information at a relatively slow pace, with appropriate pauses for processing time and with repetition if necessary; ■ state information in concrete terms; use pictures or visual symbols if necessary; ■ have the student sit close to the teacher, with an unobstructed view; ■ teach the student to ask questions about the instructions or materials presented to ensure comprehension; ■ teach the student to request slower or repeated presentations if the material is presented too rapidly.

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Interventions for Students with Cognitive Needs, cont'd.

Selected Aspects of Cognition	Possible Instructional and Compensatory Strategies
memory/learning processes	■ try to make the material to be learned significant and relevant to the student; ■ match the student's learning style (e.g., visual learner) with the instructional method; ■ give meaning to rote data to enhance comprehension and learning; ■ regularly summarize information as it is being taught; ■ give multisensory presentations; ■ reinforce information presented with pictures or other visual images; ■ control the amount of information presented at one time; ■ use overlapping techniques, such as repetition and rehearsal; ■ have the student overlearn material; ■ couple new information with previously learned information; ■ teach the student note-taking techniques; ■ teach the student to use a datebook for appointments, assignments, and other important information; ■ teach the student to use one or more of the following techniques: visual imagery, "chunking" techniques (organizing information into easily retrieved segments), association techniques, mnemonic devices, such as acronyms, repetition and rehearsal techniques or adaptive devices such as appointment books, calendars, alarm watches and tape recorders.

Interventions for Students with Cognitive Needs, cont'd.

Selected Aspects of Cognition	Possible Instructional and Compensatory Strategies
organizing processes	■ limit the number of steps in a task; ■ provide part of a sequence and have the student finish it; ■ give cues, such as "Good, now what would you do?"; ■ structure thinking processes graphically, e.g., with time lines, outlines, flow charts, graphs; ■ use categories to focus on one topic at a time; ■ identify the main idea and supporting details; categorize the details (e.g., using who, what, when, where, and why questions); teach the students to do the same when reading or listening to lecture material; ■ teach the student to practice organizational skills at home (e.g., an organizational system for school material and daily routine).
problem-solving processes	■ develop a problem-solving guide to help students through the stages of problem solving (e.g., identify the problem; acquire relevant information for solving the problem; generate several possible solutions; list pros and cons for each solution; identify the best solution; create a plan of action; evaluate the effectiveness of the plan); ■ raise questions about alternatives and consequences; ■ allow the student to bring up relevant real-life problems that are appropriate for group discussion; promote brain-storming about alternative solutions and their usefulness; ■ introduce roadblocks and complications to enhance "detouring" skills and to encourage flexibility; ■ provide ongoing, nonjudgmental feedback.

Appendix E

New York State Education Department Regional TBI Technical Assistance Projects

The Office for Special Education Services of the State Education Department has awarded grants for the development of regional technical assistance projects to assist schools in addressing the education needs of students with traumatic brain injury. These projects are designed to facilitate school reentry for children with traumatic brain injury and provide appropriate technical assistance and support to address their ongoing education needs. The components of each project include:

- coordination of planning in advance of the student's return to school;
- child-specific consultation and technical assistance to school personnel;
- support and information to families; and
- communication and collaborative planning with hospitals, rehabilitation centers, schools, and families.

Following is a list of the regional TBI technical assistance projects funded by the State Education Department:

Region	Program	Contact Person
*North Country**: BOCES Areas Served: • Clinton-Essex-Warren-Washington • Franklin-Essex-Hamilton, • Herkimer-Fulton-Hamilton-Otsego • Jefferson-Lewis-Oneida-Hamilton-Herkimer • Madison-Oneida • St. Lawrence-Lewis • Oneida-Herkimer-Madison	State University of New York at Plattsburgh 404 C Beaumont Hall Broad Street Plattsburgh, New York 12901	Jeanne Ryan Jaleh Zandi (518) 564-3137
*Capital**: BOCES Areas Served: • Albany-Schoharie-Schenectady • Rensselaer-Columbia-Greene • Hamilton-Fulton-Montgomery • Saratoga-Warren • Washington-Warren-Hamilton-Essex	Albany-Schoharie-Schenectady BOCES 1979 Central Avenue Albany, New York 12205	Timothy Feeney (518) 456-9070

Regional TBI Technical Assistance Projects, cont'd.

Region	Program	Contact Person
*Lower Hudson**: BOCES Areas Served: • Dutchess • Orange-Ulster • Putnam-Northern Westchester • Rockland • Southern Westchester • Sullivan • Ulster	Putnam-Northern Westchester BOCES Pines Bridge Road Yorktown Heights, New York 10598	Judy Spaulding (914) 248-2360
*Central**: BOCES Areas Served: • Cayuga-Onondaga • Onondaga-Cortland-Madison • Oswego • Tompkins-Seneca-Tioga	Onondaga-Cortland-Madison BOCES P.O. Box 4754 Syracuse, New York 13221	Cathie Sangster (315) 433-2658
*Southern Tier***: BOCES Areas Served: • Broome-Tioga • Delaware-Chenango-Madison-Otsego • Otsego-Delaware-Schoharie-Greene • Schuyler-Chemung-Tioga	Broome-Tioga BOCES 421 Upper Glenwood Road Binghamton, New York 13905	Karry Mullins (607) 786-8525
*Western 1**: BOCES Areas Served: • Cattaraugus-Allegany-Erie-Wyoming • Orleans-Niagara • Erie 1 • Erie 2-Chautauqua-Cattaraugus • Steuben-Allegany	Erie 1 BOCES 1050 Maryvale Drive Cheektowaga, New York 14225	Anthony Persico (716) 631-2894
*Western 2***: BOCES Areas Served: • Monroe 2-Orleans • Monroe 1 • Genesee Valley • Ontario-Seneca-Yates-Cayuga-Wayne	Monroe 2-Orleans BOCES 3599 Big Ridge Road Spencerport, New York 14559	Nancy Meserve (716) 352-2461

continued on next page

Regional TBI Technical Assistance Projects, cont'd.

Region	Program	Contact Person
*Long Island***: BOCES Areas Served • Nassau County • Eastern Suffolk • Western Suffolk	Nassau BOCES Carmen Road School Carmen Road Massapequa, New York 11762	Nancy Maher-Maxwell (516) 541-7400, ext. 142
*New York City**: Regions served: • Manhattan • Bronx • Staten Island • Queens • Brooklyn	New York City Board of Education Division of Special Education Room 430 110 Livingston St. Brooklyn, New York 11201	TBI Project Coordinator (718) 935-3579

*Funded through June 1997
**Funded through June 1995

Appendix F

Resources for School Personnel

The following list is provided for school personnel seeking additional information on programs and resources on the prevention of traumatic brain injury, information and advocacy organizations, training programs and interagency services.

TBI Prevention:

New York State Department of Health Bicycle Helmet Program

The New York State Department of Health, with funding from the New York State Developmental Disabilities Planning Council (DDPC), has established a statewide Bicycle Helmet Distribution Program. Bicyclists are encouraged to wear bicycle helmets to reduce the risk of head injuries. The program has included: distribution of bicycle helmets to income-eligible children; a statewide public education campaign; local coalition building; education for medical professionals; and evaluation. Local bicycle helmet coalitions were initially established in 11 areas of the State having the highest incidence of bicycle-related injuries.

There are 70 local projects, including at least one in each upstate county, one in each borough of New York City, and on five Native American reservations. Local coalitions have been encouraged to seek local support for their activities to assure ongoing prevention activities.

Initial indicators have shown this project to be successful in increasing bicycle helmet use by children. The federal Center for Disease Control and Prevention (CDC) has funded a formal evaluation of the project, and will disseminate the results to other states. For more information, contact: Susan Hardman, Injury Control Program, New York State Department of Health, Corning Tower, Room 621, Albany, New York 12237; (518) 473-1143.

New York State Department of Health (DOH) Manual on Playground Safety

DOH's Injury Control program has published an intervention manual which assists local health units and community-based organizations in reducing the risk of injury and death related to playground mishaps.

The manual provides step-by-step instruction on conducting a needs assessment, building coalitions, locating funding and evaluating the project. Highlights are provided on successful model intervention projects from across New York State and Utah.

For more information, contact: Jeff Simon, Injury Control Program, New York State Department of Health, Corning Tower, Room 621, Albany, New York 12237; (518) 473-1143.

Safety City Program - New York City Department of Transportation and Public School #92 - Manhattan

Motor vehicle crashes are, by far, the leading cause of preventable death among New York City children age 5 to 14 years-old. In addition, about 3,500 youngsters in this age group are injured each year on New York City's streets. Bicycle and motor vehicle collisions account for more admissions to Harlem Hospital's Pediatric Trauma Unit than any other type of injury.

Recognizing that traffic safety training, to prevent deaths and injuries, must start early in life, the New York City Department of Transportation and Public School #92 in Manhattan established the Safety City program.

Safety City is a comprehensive traffic safety education strategy which helps children learn how to make safer decisions when they cross streets, ride in cars, and drive bicycles. As active participants in the education process, the children internalize behaviors at this early stage which will help keep them safer for a lifetime.

Safety City received a State DOH Health Education Week award in 1991, and a U.S. Department of Health and Human Services award in 1993.

For more information, contact: Ron Whittaker, Safety City, c/o P.S. 92 (Manhattan), 222 West 134 Street, New York, New York 10030; (212) 368-8336.

Think First of New York, Inc.

Think First of New York, Inc., is a nonprofit organization dedicated to the prevention of brain and spinal cord injury. Its principal activities are school and community education programs for young people and other groups at risk for preventable traumatic injuries. Think First also collaborates with other injury prevention programs and supports injury prevention legislative initiatives. Think First's education programs for middle and high school students, which can be given in a classroom or an assembly, are designed to help students understand their personal vulnerability to injury, and to make them aware of things they can do to avoid risk-taking behavior. School programs include: "Harm's Way," an award-winning film on risk taking; a factual presentation on the mechanisms of injury, who is at risk, and strategies for prevention; a discussion with a young person who has sustained a brain or spinal cord injury and who relates the resulting dramatic life-style changes; and, the proper techniques for assisting injured persons. Individuals interested in starting a local Think First program, or having a Think First program come to their community, contact: Ann Burton, Director, Think First of New York, Inc., Sunnyview Rehabilitation Hospital, 1270 Belmont Avenue, Schenectady, New York 12308; (518) 382-4520.

The Head Injury Prevention Project (HIPP) UCPA of Nassau County

The Head Injury Prevention Project (HIPP) established in 1988 by the Head Injury Program of the United Cerebral Palsy Association of Nassau County, Inc., educates Long Island high school students about the incidence, causes, consequences and prevention of head injuries. Through HIPP, students hear from persons who have sustained head injuries, and who share their experiences in their recovery as well as the circumstances leading up to their injuries.

The project addresses the use of drugs and alcohol; reckless driving and speeding; seat belt use; bicycle and motorcycle helmet use. Students are also given the opportunity to ask questions and share personal experiences.

For more information, contact: United Cerebral Palsy Association of Nassau County, Inc., 380 Washington Avenue, Roosevelt, New York 11575; (516) 378-2000.

New York State Education Department Safety Education Syllabus: Grades K-12

Most hazards that cause accidents may be prevented or modified by appropriate risk-reducing behavior. This guide is intended to assist school personnel in developing safety education programs through which students can learn to identify unsafe conditions, decide on the appropriate actions to take, and reduce the risks of hazards. *The Safety Education Syllabus: Grades K-12* contains laws, regulations, recommended goals, objectives, evaluation strategies, and ideas on integrating safety education throughout various disciplines to provide the framework for local development of a comprehensive safety instruction program.

Copies of this syllabus are available from:

New York State Education Department
Publications Distribution Unit
Room 309 EB, Albany, New York 12234

INFORMATION AND ADVOCACY:

The National Head Injury Foundation (NHIF)

NHIF is a not-for-profit organization dedicated to improving the lives of people who have sustained traumatic brain injury and providing their families with support and advocacy. NHIF was founded in 1980 and currently has 45 state associations and over 29,000 members.

For further information, contact:

National Head Injury Foundation, Inc.
1776 Massachusetts Avenue, N.W.
Suite 100
Washington, DC 20036-1904
(202) 296-6443

The New York State Head Injury Association (NYS-HIA)

NYS-HIA was formed in 1982 as a statewide nonprofit organization to advocate for the many services needed by head injured people and to act as the central clearinghouse of information on head injury in New York State. NYS-HIA is also the vehicle for survivor, family, and professional networking.

The NYS-HIA sponsors local support groups/chapters across New York and is the New York Chapter of the National Head Injury Foundation. As the statewide clearinghouse of information and resources on head injury in New York, the Association maintains a Family Help Line (1-800-228-8201) and offers

families and survivors support and information. Many publications are available through the association as well as a quarterly newsletter. The NYS-HIA is active in legislative, public education, prevention, and research activities.

For further information, contact:

New York State Head Injury Association, Inc.
855 Central Avenue
Albany, New York 12206
(518) 459-7911 or 1-800-228-8201.

New York State Education Department Regional TBI Technical Assistance Projects

See Appendix E, pages 64-66.

These projects provide consultation, training and technical assistance to school personnel around the needs of individual children with TBI, support, information and assistance to families, and coordination with medical and rehabilitation programs serving children with TBI. Appendix E, pages 64-66, provides a listing of these projects.

For further information contact:

New York State Education Department
Office for Special Education Services
One Commerce Plaza
Albany, New York 12234
(518) 474-5548

TRAINING PROGRAMS:

The New York State Education Department, Office for Special Education Services

The Education of Children with Traumatic Brain Injury Training program, information and materials.

For further information, contact:

New York State Education Department
Office for Special Education Services
One Commerce Plaza
Albany, New York 12234
(518) 474-5548
Special Education Training and Resource Centers (SETRC) - See Appendix H

The Kansas State Department of Education

Traumatic Brain Injury Inservice Training Module Training manual and materials.

For further information, contact:

Kansas State Department of Education
Traumatic Brain Injury Project
University of Kansas Medical Center
3901 Rainbow Boulevard
Kansas City, Kansas 66160-7335

Interagency Resources:

Vocational and Educational Services for Individuals with Disabilities (VESID)

Vocational rehabilitation services provided by VESID assist eligible individuals with disabilities to prepare for, enter, engage in or retain gainful employment. Within two years of the student's planned exit from school, if it appears likely that the student with a traumatic brain injury will require vocational rehabilitation services as an adult, the student should be referred to VESID.

Eligibility for VESID services is based on evidence that the person has a disability that is a substantial impediment to employment; has the ability to benefit from VESID services; and will require VESID services in order to achieve an appropriate employment outcome. VESID staff assist students with the eligibility process, including obtaining additional evaluations as needed for determinations of eligibility or for vocational planning. While not every student who has traumatic brain injury may be eligible for VESID services, the school and family's referral of relevant information will speed up the determination of eligibility and development of students' plans for vocational rehabilitation services.

Examples of vocational rehabilitation services that VESID may provide include, but are not limited to: evaluations, vocational planning and counseling, referrals to appropriate community resources, skills development training, adaptive equipment, support services while completing training, employment services including job seeking skills, employment referrals, on-the-job services (e.g., job coaching, planning work site modifications), and occupational tools.

VESID may provide services to in-school youth that do not duplicate services or programs that are mandated for districts to provide. The services that a student with traumatic brain injury receives will vary depending on what is needed by the student to achieve the planned employment outcome.

When referring students to VESID, the school district is encouraged to contact the district office of NYS VESID with any questions. To locate the office near you, call 1-(800)-222-JOBS.

Office of Mental Retardation and Developmental Disabilities (OMRDD)

OMRDD is committed to planning for the provision of appropriate services to people with developmental disabilities resulting from traumatic brain injury when the injury originates before the person attains age 22 and the individual meets the other eligibility criteria for the receipt of services from OMRDD. According to OMRDD policy, the term "neurological impairment" refers to the disorders of the brain and central nervous system that substantially impair the use and development of language, understanding, memory, attention span, fine muscle control, and adaptive behavior and thus includes children, adolescents and adults with various forms of traumatic brain injury.

Throughout New York State, OMRDD operates 20 district offices known as Developmental Disabilities Service Offices or DDSOs. Each of these offices has a Traumatic Brain Injury Coordinator who assists children with TBI and their

families in planning, identification and access to needed services.

The OMRDD provides a range of special services that can minimize the impact of TBI on individuals and families. These include:

- ❑ Ongoing neuropsychological assessment and follow-up treatment planning;
- ❑ Case management;
- ❑ Comprehensive community integration services;
- ❑ Family supports;
- ❑ Education, work, and day services;
- ❑ Specialized services such as cognitive retraining, psychiatric services, behavioral services;
- ❑ Vocational rehabilitation; and
- ❑ Residential supports.

For further information on services for individuals with TBI, contact your DDSO or Nina C. Schillinger, NYS OMRDD Statewide TBI Coordinator at (518) 473-1890.

Department of Health (DOH)

In 1986, DOH produced a report, "Head Injury in New York State," to the Governor and the Legislature. As a result of this report, the Head Injury Services Coordinating Council (HISCC) was established in 1989. The HISCC mission is to promote and strengthen the network of services for people with head injury and their families in New York State by creating a partnership among consumers and providers of services and representatives of state agencies to support public planning and policy making. The committees of HISCC are open to the public. They include:

- ❑ Community Resource/Community Liaison Committee;
- ❑ Adult Vocational and Educational Issues Committee;
- ❑ Consumer Rights, Quality of Care and Public Policy Committee; and
- ❑ Families with Children Committee.

The Families with Children Committee has a focus of finding children who are "falling through the cracks" and advocating for these children and for systems change and improvement.

In March 1994, the Federal government approved the DOH Home and Community-based Services Medicaid Waiver for Individuals with TBI. The waiver serves individuals between the ages of 18 and 64 years to provide community services for persons with TBI in New York State.

In addition, the Regional Resource Coordination Project, funded by a grant from the Developmental Disabilities Planning Council (DDPC), is working to develop resources by organizing community task forces and providing training.

For information regarding the DOH programs, contact Dr. William Reynolds, Director, Bureau of Standards Development at (518)-474-8645.

Appendix G

Questions and Answers Related to the Education of Students with Traumatic Brain Injury

Is medical documentation necessary for a classification of "Traumatic Brain Injury" (TBI) for purposes of special education?

Upon referral for special education services, a comprehensive evaluation must be conducted which includes a physical examination, psychological assessment (as deemed necessary by the school psychologist), social history, observation in the classroom, appropriate educational evaluations, and assessments in all areas relating to the suspected disability. The Committee on Special Education is required to determine the appropriate classification by reviewing the evaluation and test results. While the regulations do not require specific medical documentation for any of the classifications, the medical history of a student should be relevant in identifying a student as TBI. Where there is credible information to indicate a brain injury based on either medical, social history, or other reports, and the resulting impairments are determined to adversely affect the student's educational performance, a classification of TBI would be appropriate.

To what extent should children with medical conditions who require special education services be classified as "traumatically brain-injured?"

The category of TBI was developed to identify eligibility for special education services for students who have had a direct injury to the brain which is either the result of a medical condition or physical trauma. Alternately, a child with a medical condition which primarily affects physical abilities, vitality and alertness and which adversely affects the student's educational performance may more appropriately be classified as "Other Health Impaired."

Should a student who requires special education services be classified as TBI even though the injury occurred several years earlier?

The younger the child, the more profound the long-term effects may be, especially with respect to behavioral self-regulation and learning. Because brain injuries to children and adolescents occur in brains that are in the process of developing, the cognitive, social and behavioral effects are often not seen until later in life as these higher level skills are required. Therefore, it may be appropriate to classify a student as TBI regardless of the age when the injury occurred, except that, by definition, the injury must be one that occurred after birth and not be related to a birth trauma. In addition, changing a student's existing classification to TBI may alert general and special education teachers and related services providers to consider assessments and interventions in light of the traumatic brain injury.

In Section 200.1(mm)(6) of the Regulations of the Commissioner of Education, the definition of "learning disabled" includes the terms "brain injury" and "minimal brain dysfunction." How does this relate to the definition of "traumatic brain injury?"

For students whose brain injuries are congenital or caused by birth trauma, the classification of learning disabled would apply if the student otherwise meets the criteria of the definition of "learning disabled." The definition of "traumatic brain injury" pertains to students with brain injuries acquired after birth and specifically excludes congenital brain injuries or brain injuries resulting from birth trauma.

Is cognitive therapy a related service?

For many students with TBI, the goal of addressing impaired cognitive functions in areas such as memory, attention, organization, etc. should be identified in the Individualized Education Program (IEP). Many of the

interventions of classroom teachers, speech and language therapists, occupational therapists, counselors, and other related services providers are designed to address these cognitive areas. The goals and interventions to address these cognitive deficits should be delineated under the goals and objectives section of the IEP relating to the services of the teacher and/or related services providers. For example, a speech and language therapy goal to address a cognitive deficit may be to assist a student to organize his thoughts before speaking. A teacher may teach the student how to use graphic organizers for reading comprehension or self-cuing for behavioral control. Therefore, cognitive therapy should not be viewed as an isolated service, but one that is integrated into the child's program throughout the day.

Are students with brain injuries who are determined ineligible for special education services eligible for services under Section 504 of the Rehabilitation Act of 1973?

The definition of "handicapped persons" under Section 504 includes "... any person who has a physical or mental impairment which substantially limits a major life activity..." Depending on the severity of the brain injury, a student may be protected under Section 504 even though the impairment does not interfere with the student's ability to learn. Under Section 504, children with disabilities are entitled to accommodations and services that are necessary to enable them to benefit from programs and activities available to nondisabled children. If a child is handicapped as defined by Section 504, he or she must be provided with those accommodations which the child needs to access regular instruction and non-academic activities. Documentation of such accommodations must be maintained in the child's cumulative file.

Does every student with a traumatic brain injury require a neuropsychological evaluation?

A determination of a student's need for a neuropsychological evaluation must be made on an individual basis, but is not automatically required for every student classified or suspected of being TBI. Nonetheless, the neuropsychological evaluation can provide valuable information on a student's abilities in areas such as sensory perception, motor and psychomotor skills, organizational abilities, memory, and problem solving.

Why is close collaboration between teachers and related services providers essential for students with TBI?

Close collaboration between teachers and related services providers is important for all students with disabilities. However, due to the cognitive difficulties experienced by many students with TBI, consistency in approach is essential. These students often experience confusion, have difficulties transferring and generalizing information, and need continuity and extensive practice for new learning to occur. Given the multiple and changing needs associated with TBI, the education team also needs to collaborate on setting priorities and in reviewing the child's progress.

To what extent are support services available to families of students with TBI?

Every effort should be made to involve the parents of students with TBI in the education process and to provide them with support and assistance. This support can be offered in the form of parent counseling, training, sharing of information, counseling for siblings, and providing opportunities for the active involvement in the student's education program. It is important to note that for students with disabilities, parent counseling and training are included as a "related service" (8NYCRR 200.1(gg)). In addition, for students with disabilities whose management needs are highly intensive, who require a significant or high degree of individualized attention and intervention, or have severe multiple disabilities, parent counseling and/or education to enable parents to perform appropriate follow-up activities at home are required (8NYCRR 200.6(g)(8)).

Schools can also assist families by locating support services for them in the community. State agencies such as the Office of Mental Retardation and Developmental Disabilities, the Department of Social Services, and the Department of Health can provide services that

help families with the day-to-day challenges they face as family members of a child with a disability.

Is it appropriate to classify a student with TBI for purposes of special education if he/she performs adequately on standardized tests?

The results of a comprehensive evaluation help to determine if a student requires special education services. While standardized testing is an important component of a comprehensive evaluation, the results of the physical examination, the psychological evaluation (if deemed appropriate), the social history, the classroom observation, the educational evaluations, the vocational assessment, and other assessments related to the suspected disability must be considered as well. For students with TBI, it is important to note that standardized tests most often measure academic skills and information acquired prior to the student's injury. The assessment of these preserved abilities, although extremely important in establishing a complete profile of the student, may not reflect the student's impaired cognitive abilities. The results of standardized tests, when considered alone, may over-estimate the student's ability to function in school. Therefore, a comprehensive assessment for a student with TBI should incorporate information gained from observations of the student in the actual classroom setting and typical school environments. In any case, no single procedure can be used as the sole criterion for determining an appropriate educational program and the assessment must include all areas related to the suspected disability.

Appendix H

SPECIAL EDUCATION TRAINING AND RESOURCE CENTERS IN NEW YORK STATE TRAINING NETWORK

OFFICE for SPECIAL EDUCATION SERVICES

New York State Education Department
Albany, New York 12234
Phone (518) 474-5548

Albany-Schoharie-Schenectady BOCES SETRC
Maywood School
1979 Central Avenue
Albany, New York 12205
(518) 456-9069

Broome-Delaware-Tioga BOCES SETRC
435 Upper Glenwood Road
Binghamton, New York
13905-1699
(607) 729-9301, ext. 362 and 303

Buffalo City SETRC
School #75 - 99 Monroe Street
Buffalo, New York 14206
(716) 851-3919 or 851-3844

Cattaraugus-Allegany-Erie-Wyoming BOCES SETRC
1825 Windfall Road
Olean, New York 14760
(716) 372-8293, ext. 224

Cayuga-Onondaga BOCES SETRC
5890 South Street Road
Auburn, New York 13021
(315) 253-0361

Clinton-Essex-Warren-Washington BOCES SETRC - Box 455
Plattsburgh, New York 12901
(518) 561-0900, ext. 216

Delaware-Chenango SETRC
10 North Canal Street
Greene, New York 13778
(607) 656-4105

Dutchess BOCES SETRC
350 Dutchess Turnpike
Poughkeepsie, New York 12603
(914) 473-1190, ext. 3030

Erie 1 BOCES SETRC
1050 Maryvale Drive
Cheektowaga, New York 14225
(716) 631-2894

Erie 2-Chautauqua-Cattaraugus BOCES SETRC
9520 Fredonia Stockton Road
Fredonia, New York 14063
(716) 672-4371, ext. 337 or 275
1(800) 344-9611

Franklin-Essex-Hamilton BOCES SETRC
North Franklin Educational Center
52 State Street
Malone, New York 12953
(518) 483-1390

Genesee Valley BOCES SETRC
8250 State Street Road
Batavia, New York 14020
(716) 344-7738

Hamilton-Fulton-Montgomery BOCES SETRC
Fulton-Montgomery Community College
Route 67 - Room L210
Johnstown, New York 12095
(518) 762-7754

Herkimer-Fulton-Hamilton-Otsego BOCES SETRC
400 Gros Blvd.
Herkimer, New York 13350-1499
(315) 867-2082

Jefferson-Lewis-Hamilton-Herkimer-Oneida BOCES SETRC
Arsenal Street Road
Watertown, New York 13601
(315) 785-9137
1 (800) 544-3645

Madison-Oneida BOCES SETRC
Spring Road
Verona, New York 13478
(315) 363-8000

Monroe 1 BOCES SETRC
119-S South Avenue
Webster, New York 14580
(716) 265-4030

Monroe 2-Orleans BOCES SETRC
3599 Big Ridge Road
Spencerport, New York 14559
(716) 352-2443

Nassau County BOCES SETRC
Rosemary Kennedy Center
2850 North Jerusalem Road
Wantagh, New York 11793
(516) 781-4044, ext. 270-1-2

New York City SETRC
New York City Board of Education
Division of Special Education
110 Livingston Street - Room 424
Brooklyn, New York 11201
(718) 935-4267

New York City SETRC
Manhattan High School Office
122 Amsterdam Avenue - Rm 330
New York, New York 10023
(212) 496-0440

NYC Region I SETRC
280 Broadway - Room 324
New York, New York 10007
(212) 233-6900

NYC Region II SETRC
Edward R. Byrne School
2750 Lafayette Avenue
Rm. 304
Bronx, New York 10465
(212) 892-5527

NYC Region III SETRC
360 36th Street
Brooklyn, New York 11232
(718) 965-4800, ext. 53

NYC Region IV SETRC
P.S. 199
1110 Elm Avenue
Brooklyn, New York 11230
(718) 645-8515

NYC Region V SETRC
Queens Regional
29-76 Northern Boulevard
Long Island City, New York 11101
(718) 472-7800

Brooklyn High School
Superintendent Office
Room 200
1600 Avenue L
Brooklyn, New York 11230
(718) 338-9703, ext. 660

Basis High School Superintendent Office
1171 65th Street
Brooklyn, New York 11219
(718) 236-5455, ext. 43

Bronx Superintendent Office
Room 122
3000 E. Tremont Avenue
Bronx, New York 10461
(212) 892-9926

Queens High School
Superintendent Office
Newtown Annex High School
105-25 Horace Harding
Expressway
Corona, New York 11368
(718) 592-4496

New York City SETRC
Region VI - PS 31
55 Layton Avenue
Staten Island, New York 10301
(718)-727-9355, ext. 33

New York City SETRC
UFT - Special Education Support
Program
260 Park Avenue South
New York City, New York 10010
(212)-260-7679

New York City SETRC
Alternative High Schools and
Programs
351 West 18th Street
Room 136
New York City, New York 10011
(212)-206-0570

Oneida-Herkimer-Madison
BOCES SETRC
Box 70-Middle Settlement Road
New Hartford, New York 13413
(315) 793-8614 or 793-8686

Onondaga-Cortland-Madison
BOCES SETRC
P.O. Box 4774
Syracuse, New York 13221
(315) 433-2645

Ontario-Seneca-Yates-Cayuga-
Wayne BOCES SETRC
Clifton Springs Education Center
36 South Street
Clifton Springs, New York 14432
(315) 462-5056

Orange-Ulster BOCES SETRC
RD #2, Gibson Road
Goshen, New York 10924
(914) 294-5431, ext. 284

Orleans-Niagara BOCES SETRC
Kenan Site
195 Beattie Avenue
Lockport, New York 14094
(716) 439-4328, 4329 or 4320

Oswego BOCES SETRC
County Route 64
Mexico, New York 13114
(315) 963-4320

Otsego-Northern Catskills BOCES
SETRC
Rexmere Park
Stamford, New York 12167
(607) 652-7531, ext. 240

Putnam-No. Westchester
BOCES SETRC
200 BOCES Drive
Yorktown Heights, New York 10598
(914) 245-2700, ext. 288

Rensselaer-Columbia-Greene
BOCES SETRC
1550 Schuurman Road
Castleton, New York 12033
(518) 732-4474

Rochester City SETRC
Central Administrative Offices
131 West Broad Street
Rochester, New York 14614
(716) 262-8710 or 262-8711

Rockland BOCES SETRC
BOCES Media Center
Railroad Avenue School
One Cosgrove Avenue
West Haverstraw, New York 10993
(914) 429-1090

St. Lawrence-Lewis BOCES SETRC
Northeast Campus, P.O. Box 330
Norwood, New York 13668
(315) 353-6684

Saratoga-Warren BOCES SETRC
Myers Education Center
Henning Road
Saratoga Springs, New York 12866
(518) 584-3239, ext. 286

Schuyler-Chemung-Tioga BOCES SETRC
Instructional Support Center
431 Philo Road
Elmira, New York 14903
(607) 739-3581, ext. 455

Steuben-Allegany BOCES SETRC
6666 Babcock - Hollow Road
Bath, New York 14810
(607) 776-7631

Suffolk 2 BOCES SETRC
School Services Center
Winganhauppauge Road
Islip, New York 11751
(516) 277-7403

Sullivan BOCES SETRC
85 Ferndale Loomis Road
Liberty, New York 12754
(914) 292-0082

Syracuse City SETRC
Teacher Center
501 Park Street
Syracuse, New York 13203
(315) 435-4685

Tompkins-Seneca-Tioga BOCES SETRC
555 South Warren Road
Ithaca, New York 14850
(607) 257-1551, ext. 276

Ulster BOCES SETRC
175 Route 32 North
New Paltz, New York 12561
(914) 255-1402

Washington-Warren-Hamilton-Essex BOCES SETRC
Dix Avenue
Southern Adirondack Education Center
Hudson Falls, New York 12839
(518) 584-3239, ext. 246

Westchester 2 BOCES SETRC
Instructional Services Department
2 Westchester Plaza
Elmsford, New York 10523
(914) 345-8500

Yonkers City SETRC
Administrative Annex
John Burroughs Junior High School
150 Rockland Avenue - Rm. 4031
Yonkers, New York 10710
(914) 376-8208, ext. 245

Appendix I

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